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ABSTRACT

A study addressed the impact of household composition--preschool, school-age, or no children--and nature of the home workspace--dedicated room or area--on IBM employees' satisfaction, stress, and work effectiveness. The IBM program allowed 300 employees who spent about 70 percent of their time with clients to work in home offices. Surveys, interviews, observations, photographs, and archival data were used. Findings included the following: employees worked roughly 35 percent of the time from home and 27 percent from customer sites, with no significant variations as a function of household composition and nature of home workspace; the home office was used most, with no differences as a function of household composition, home workspace, or gender; 76 percent were somewhat or very satisfied with the mobility program, with no significant variations as a function of household composition or home workspace; 52 percent reported overall work effectiveness as better or much better; and 18 percent reported it as worse or much worse. Employees with dedicated rooms rated their overall work effectiveness somewhat higher. Over 77 percent rated professional communication at work as somewhat or much worse; 88 percent rated their ability to socialize with co-workers as worse or much worse; 46 percent reported positive or very positive spillover (between work and family life); but 41 percent reported the impact on role conflict was negative or very negative. (Appendixes contain 49 references and survey instruments.) (YLB)

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ED 418 274

Workscape 21

The Ecology of New Ways of Working

The Ecology of the Mobile Worker

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Foreword

The International Workplace Studies Program is a research program based at Cornell University in Ithaca, New York. The program is supported by a consortium of private and public sector organizations in the United States, the United Kingdom, Europe, and Japan, and was launched in 1989. The IWSP mission is to generate research-based information related to the planning, design, and management of facilities that contribute to the development of more competitive and effective organizations.

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Executive Summary

Companies today are continuously searching for ways to reduce their overall operating costs, increase productivity, and strengthen their competitive position in the global marketplace. As part of this effort, companies are beginning to rethink the nature of work itself, and particularly the way in which it is structured and where and when it occurs. New information technologies, changing workforce demographics, rising customer expectations, and cost pressures are, in combination, forcing companies to invent new workplace strategies that challenge traditional ideas of what the office is.

These new workplace strategies include such programs as telecommuting, telework centers, non-territorial offices, and team spaces. In these strategies, employees are given a choice as to where they work and how they schedule work activities, to provide more personal flexibility in work activities and closer direct contact with the customer, while the organization often gains through reduced space costs and more productive use of employee time.

In these different programs, the home often becomes an integral part in the workplace strategy, along with the use of non-territorial offices, telework centers, and information technologies to support mobile work. In such workplace systems, work increasingly spills over into employees' family lives. An important question is the extent to which factors such as household composition, whether one is married or single, has children, and so on, as well as the nature of the home and other alternative work environments, affect employees' response to and ability to work effectively in a mobile environment. This report addresses the impact, specifically, of such factors as household composition and the nature of the home workspace on employees' satisfaction, stress, and work effectiveness.

Research Questions

The following questions were addressed in this study:

- What were the characteristics of the integrated workplace system referred to as the Midwest Mobility Program?
- What were the patterns of time and setting use for mobile employees?
- What were the main effects of household composition and home workspace on measures of satisfaction, stress and work effectiveness?

- What other variables, such as gender, age, and job type had a significant effect on employee satisfaction, stress and work effectiveness?

Site and Sample Selection

The company selected for study, IBM, implemented an integrated workplace strategy—which they referred to as the Midwest Mobility Program—in Indiana in 1992-1993. All customer-related employees in technical services, marketing, and management positions were moved out of costly real estate and into a program consisting of a variety of work locations. The program allowed employees who spent a large portion of their time (approximately 70%) with clients to work the remainder of their time in home offices and a central office—called a Productivity Center—using unassigned, non-territorial workstations and offices. In addition, employees were free to work in any number of "found" workspaces, including IBM drop-in sites, restaurants, hotels, airports, airplanes, and automobiles.

Approximately three hundred employees participated in the program at the time the study was conducted. These employees represented a cross-section of household compositions, home workspace types, and job categories.

Five data collection methods were employed in this study: surveys, interviews, personal observations, photographs, and archival data. Employee responses were grouped according to whether employees had pre-school children, school-age children, or no children. Home workspace was divided according to whether the employees had a dedicated room (a room specifically dedicated to work) or a dedicated area (a specific area dedicated to work located in a multi-purpose room) in their homes.

Summary of Key Findings

Work Patterns

- Employees worked an average of 60 hours a week, higher than previously (a factor which may be unrelated to mobile work per se). Roughly 35% was spent working from home and 27% from customer's sites. There were no significant variations as a function of household composition and nature of home workspace. However, employees with pre-school children tended to work more at home than other employees.

- The home office was used more than any other work setting and considered the best place for doing work requiring high concentration. There were no differences as a function of household composition, home workspace, or gender.

- Almost 40% of the respondents found non-traditional hours to be productive; and of this 40%, employees with children were more likely to report working non-traditional hours than employees without children.

Satisfaction with Mobility Program

- Seventy-six percent of the respondents were somewhat or very satisfied with the mobility program; 13% reported being somewhat or very dissatisfied. There were no significant variations as a function of household composition and nature of home workspace.

- While overall satisfaction levels with the mobility program were high for both men and women, women were more satisfied than men.

Work Effectiveness

- Close to 52% of the respondents reported that their overall work effectiveness was better or much better; 18% reported that it was worse or much worse. While employees with dedicated rooms rated their overall work effectiveness somewhat higher than those with dedicated areas, there were no statistically significant differences as a function of household composition.

Professional and Social Communication

- Over 77% of the respondents reported that professional communication at work was somewhat or much worse since the mobility program began; 9% rated professional communication as better or much better.

- Eighty-eight percent of the mobile workers rated their ability to socialize with their co-workers as worse or much worse; 3% said it was better or much better. There were no significant differences as a function of household composition, home workspace, or any of the other secondary variables examined in this study.

Job Satisfaction

- Sixty-two percent of the respondents reported being somewhat or very satisfied with their jobs; 17% said they were somewhat or very dissatisfied with their jobs. No significant differences occurred as a function of household composition or home workspace.

- While overall job satisfaction scores were high, employees who had been participating in the mobility program for more than twelve months had significantly lower scores for job satisfaction (but not low scores in an absolute sense) than did those who had been participating for less than twelve months. Women also rated job satisfaction higher than did men.

Job Stress, Spillover and Role Conflict

- Forty-seven percent reported job stress as high or very high; 19% said it was low or very low. There were no significant differences as a function of home workspace, but there were as a function of household composition. Mobile employees with no children reported significantly less stress than those with pre-school children. Married or partnered couples had higher stress scores than divorced or single employees.

- Forty-six percent of the respondents reported positive or very positive spillover (between work and family life) as a result of the mobility program; 14% reported the effect to be negative. Women reported more positive spillover than men.

- Somewhat conflicting with the above findings, 41% of the respondents reported that the impact of the mobility program on role conflict was negative or very negative. Men were more negatively affected than women. Surprisingly, there were no significant differences for the type of home workspace.

Conclusion

Data from this study suggest that employee acceptance of an integrated workplace strategy, where one key component of the workplace system is the opportunity to work at home, is largely unaffected by household composition or the nature of the home workspace. Other issues, however, deserve some mention.

By providing employees with a range of settings and the technology and support they needed to perform work at any time and at several key settings, the IBM Midwest Mobility Program goes beyond typical flextime programs in which there are a few hours during the morning or evening

during which employees can arrange their schedules. The mobility program studied here provides virtually unlimited choice in where and when one works, thus making it easier to balance work and family life. The importance of this greater time/space freedom is underscored by the finding that almost 40% of the respondents reported their most effective work time to be *outside* the traditional 8 a.m. to 5 p.m. workday.

Families with pre-school children reported higher levels of stress and role conflict than those with no children. While these conflicts were not sufficiently intense to undermine a high level of overall satisfaction, they are likely to be more intense for those living in smaller residences, such as those people living in apartments in urban areas. At the very least, the more the home work environment must vie with living space, the more likely it is that employees will have to devote energy and imagination developing rules and protocol for how and when family members interact, where and when certain activities occur, and so on.

A critical issue that organizations need to investigate is loss of communication, both social and professional. Without programs to stimulate planned informal interaction and business communication, the organization loses the collective learning and connectivity that is so valuable to the long term success of the organization.

Overall, the Midwest Mobility Program has been successful. It is especially interesting in that IBM has been able to move from small scale, pilot projects to an approach to mobility that appears to be working (if our data generalize to other parts of IBM that have implemented mobility programs) for several thousand employees across the field sales component of the company. The challenge, for IBM and other organizations developing and implementing such programs, will be to effectively deal with the social and communication issues over the long term, where they are likely to surface even more strongly as a concern among staff. Second, is to be careful about assuming that the home is a viable workplace option, which it may be less of for those living in smaller residences. In those cases where it may not be, the design of workplace options like the Productivity Center (or other telework centers) may become more important.

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Introduction

Companies today are continuously searching for ways to cut their overall operating costs, increase productivity, and increase their competitiveness in the global market. Companies are asking themselves why and how employees perform work, and restructuring the business framework to make more efficient systems and relationships. These simple questions are the basic premise of corporate reengineering:

> Business reengineering means putting aside much of the received wisdom of two hundred years of industrial management. It means forgetting how work was done in the age of mass market and deciding how it can best be done now...What matters in reengineering is how we want to organize work today, given the demands of today's markets and the power of today's technologies. (Hammer & Champy, 1993, p. 2)

Two questions that receive less attention, but can provide considerable gains, are *when* and *where* employees are working. Many studies suggest that when employees have discretion over the conditions of work—how, when, and where work is accomplished—job satisfaction and productivity, as well as ability to balance work and family life, increase (Bailyn, 1993; Manning, 1985).

How do organizations give their employees the control they need to perform at their best? One emerging solution is the use of alternative workplace strategies. These strategies include such practices as telecommuting, telework centers, non-territorial offices, team spaces, etc. (Becker, Quinn, Rappaport & Sims, 1993). These practices give employees a greater sense of control over their work because they are given a choice as to where they work and how they schedule work activities. For example, a person who works in a telework center may save certain concentrative tasks, such as reading and writing, for days when he/she is in the telework center, and perform team tasks in the central office.

One implication of these workplace practices that is often neglected is they affect the family and the work-family relationship. This report looks at how an integrated workplace system, with the home setting as an integral part of the system, affects family life. More specifically, the study addresses the impact of household composition and the nature of the home workspace on employees' satisfaction, stress, and work effectiveness.

Conceptual Framework

Reasons organizations implement these programs

Occupancy Patterns

Many of the workplace strategies today have been implemented in an attempt to reduce overall costs and increase organizational competitiveness (Becker, Quinn, Rappaport & Sims, 1993; Gordon, 1988; Huws, Korte & Robinson, 1990; Korte, 1988; Olson, 1988). The shift away from a manufacturing economy towards a service and knowledge-based economy has decreased the need for workers to be in close physical proximity to carry out their jobs. Many employees already spend a large amount of time out of the office, either with clients, traveling, or at other company locations. Organizations are asking, "If these employees are out of the office 60-70% of the time, what is the necessity of providing them with a full-time private office?" Employers may see the use of alternative workplace practices such as non-territorial offices that significantly increase the ratio of employees to workstations above the traditional 1:1 ratio, as an opportunity to reduce real estate costs by consolidating office space when leases come due, or by the sale of owned property.

Rightsizing

Contributing to the ability to reduce real estate requirements, as the publication *Workforce 2000* and other works suggest, is "rightsizing"—where a single employee may be performing the same job that five employees performed only two years (Gordon, 1988; Huws et al., 1990; Olson, 1988).

Productivity

Another driver of non-traditional corporate workplace arrangements are reported gains in productivity from ten to 100% as a result of implementing some form of telecommuting (Alvi & McIntyre, 1993; Gordon, 1988; Manning, 1985). Complementing gains in productivity is the perceived ability to reduce turnover and absenteeism as a result of employees being able to schedule their workload around work conflicts (Huws et al., 1990; Korte, 1988).

Workforce Demographics

Organizations also cite the need to react to changing workforce demographics as a reason for considering alternative workplace programs. More women in the workforce, greater numbers of single parents, and greater diversity in general are driving companies to offer alternatives to the

traditional office environment to help families balance work and personal lives. As mentioned above, a flexible workplace allows employees to balance work and family responsibilities by giving them the freedom to resolve work-family conflicts. For example, families now have the flexibility to get children to and from day care, perform occasional sick childcare or dependent care to, for example, an elderly parent (Bureau of National Affairs, 1992; Christensen, 1987).

The ability to recruit and retain a highly qualified workforce in the face of slow labor force growth is a strong motivator for implementing an alternative workplace program (Alvi & McIntyre, 1993; Coates, 1991; Gordon, 1988; Huws et al., 1990; Korte, 1988; Olson, 1985). Using some form of alternative workplace strategy (such as telecommuting or work-at-home), organizations can expand their recruitment opportunities by including classes of workers that would otherwise go untapped. These classes include, among others, disabled workers, homemakers, and childcare providers (Gordon, 1988; Huws et al., 1990). Organizations are also able to retain valuable employees who might otherwise leave (Becker, Quinn, Rappaport & Sims, 1993; Gordon, 1988; Korte, 1988).

Reasons employees participate in alternative workplace practices

Quality of Life and Autonomy

Many alternative workplace programs are initiated by employees seeking a higher quality of life, more personal time, a reduced commute, and improved concentration. Autonomy and control over one's work are also increasingly given as reasons for participation in alternative workplace practices. Over the years, the ability to control one's work has become more and more important among U.S. workers. In the age of rightsizing, where one would expect that issues such as job security and job satisfaction would be the most significant factors to employees, some studies suggest that job control (at least for those still employed) is considered very important (Olson, 1988). Olson argues, however, that the expressed desire for autonomy may really be a desire for flexibility in managing *when* to work—an issue of time (Korte, 1988; Olson, 1988). Other benefits to employees may include reduced costs of transportation, parking, food, and clothing. Families may benefit from the savings generated by being able to offset the costs of childcare (Alvi & McIntyre, 1993).

Increased job satisfaction is another potential benefit for participating in alternative workplace practices. In a study comparing in-house employees and work-at-home employees, DuBrin (1991) found that, while overall job satisfaction between groups was similar, work-at-home employees rated their satisfaction with working conditions, opportunity to schedule their own work, and

ability to take care of family and personal responsibilities higher than did the in-house employees (DuBrin, 1991; DuBrin & Barnard, 1993).

While some studies have examined components of alternative workplace practices individually, only a handful have acknowledged the importance of analyzing the workplace as an integrated system linking the physical location and movement of people and the electronic movement of information (Becker, 1986). Others have considered the impact new working practices have on the family (Ahrentzen, 1990; McLaughlin, 1981), and several have studied the impact of household composition on employees' response to the workplace setting (Rowe & Bentley, 1992; Rowe, Stafford & Owen, 1992). However, no research has attempted to investigate the effects of household composition *and* home workspace on components of employee satisfaction, stress and effectiveness in the workplace from a comprehensive integrated systems perspective.

Integrated Workplace Strategies and the Home

While alternative workplace practices such as non-territorial offices and home-based telecommuting give employees a better sense of control over their work conditions, by themselves they may not give employees the range of freedom they need to work most efficiently. Employees who are relegated to a specific alternative location, such as the home office, may only find themselves substituting one set of workplace constraints with another. Similarly, employees allowed to work on flextime, but required to do so during specific "flexible hours," such as working from 7:00 a.m. to 4:00 p.m., may not find the available flexibility sufficiently broad. Bohen and Viveros Long (1981), for example, found that working mothers reported that flextime programs did not give them the flexibility they needed to actually meet family and work obligations.

Examples of other problems that individual workplace practices can cause include: working exclusively from home introduces such problems as social isolation, role overload, and role conflict (Salomon & Salomon, 1984); working in non-territorial or shared assigned spaces can result in employees losing their "sense of place" in the organization, and employees may report problems with finding a space to work (Becker, Davis & Sims, 1991); and managers of employees working exclusively from telework centers may report difficulties in team activities and coordination (Becker, Rappaport, Quinn & Sims, 1993).

The next step for organizations exploring new workplace options is to look upon these individual components of a workplace strategy as just one part of an integrated workplace system. This system includes not just the physical settings of work, but the information technology, management practices and policies, attitudes and values, and work processes appropriate to support working in these different settings. Thus the workplace becomes a system of loosely-

coupled settings linked by the physical movement of employees and the electronic movement of information (Becker, 1990; Becker, Gray, Markus & PonTell, in press; Becker, Quinn, Rappaport & Sims, 1994; Becker & Steele, 1995).

In such workplace systems work increasingly spills over into employees' family lives. Employees may find it more and more difficult to separate work and family domains, especially when the home becomes an integral part of work life. Is this inability to separate work and family favorable or unfavorable? Employees polled about the disadvantages of working remotely frequently cite the lack of clear boundaries between work life and personal life (including family if there is one) as a major difficulty (Huws et al., 1990). The consequences of the disintegration of boundaries between work and family can be spillover and role conflict, both of which can be unfavorable.

Other studies, while admitting that these factors occur, contend that they are minimal, or even beneficial, to the family. For example, Becker (1986) proposed that in a series of loosely-coupled settings with the home as one of several work settings, negative effects of work-family interaction would be minimized by virtue of the links being loose rather than tight. The key element of the loose link is the opportunity for employees to choose where and when to work, depending on their own particular circumstances and workstyle. Beach (1989) found that families do not necessarily find spillover to be undesirable; rather, family members enjoy higher satisfaction due to *integration* of work and family lives. So, then, rather than demanding that work occur in the home, integrated workplace strategies offer employees the ability to control the extent to which work is introduced into their non-work lives.

Inadequate workspace at home is another frequent concern about participation in alternative workplace practices that use the home as a primary setting (Cross & Raizman, 1986). Employees with large families, young children, spouses at home, or dependent adults at home worry that inadequate space at home will result in frequent interruptions of both work and daily family activities.

Finally, overwork often becomes a way of life for home-workers, and has been found to increase job stress, as well as stress between family members due to conflicts in time scheduling demands and lack of spatial separation (Gurstein, 1991). People working from home frequently contend that, because they *can* work at home and could potentially work all hours of the day, they often have a difficult time establishing when to stop working (Becker & Joroff, 1995; Manning, 1985). Gurstein (1991) says, "Contrary to the idealized vision of homework allowing for a greater balance between work and family life, many of those who work at home appear to work long hours and have little time to devote to their families and housework" (p. 170).

Considering the home as one of several settings within the integrated workplace strategy framework calls for further investigation of the implications of integrating work and family life, the type of office space available in the home, and the potential for overwork as a result of work being in the home. The following section looks at some of the research available on these topics.

Work and the Family

Studies agree that work life has an impact on family life (Bailyn, 1993; Manning, 1985; Weiss, 1990). Although, while dynamics at work impact—both positively and negatively—the family system, so too do conditions within the family impact an employee's performance at work, and thus the entire organizational system (Ahrentzen, 1990; Beach, 1989; Crouter, 1984; DuBrin, 1991; Lambert, 1990; McLaughlin, 1981; Rowe & Bentley, 1992; Voydanoff, 1987).

The biggest issues for work and family are spillover and role conflict. The concepts of role and role setting are critical to understanding how people who work in a variety of settings which include the home manage to maintain multiple yet distinct—and sometimes contradictory—roles (Ahrentzen, 1990). If expectations (of self and others) regarding appropriate role behaviors are not met, the potential for role conflict is high. The following sections report work-family research findings which encompass two themes: spillover and role conflict, and the adaptations made to manage them.

Spillover and Role Conflict

The term *spillover* has been used to describe the *influence* work and family life have on each other. Spillover may be positive, as when work challenge or satisfaction resulting in the creation of motivation and enthusiasm carries over into family life; or negative, for example, when the work is too demanding or the individual is overly involved with work and neglects family life (Voydanoff, 1987). A study by Piotrkowski (1979) found that workers who liked their jobs and had control over job demands brought more positive energy and availability to their families, while those who reported high levels of stress, work overload, or conflicting demands brought their tension home with them, requiring other family members to adapt to their emotions.

Spillover has been used to refer to *stress* which spreads from work to family, from family to work, or in both directions simultaneously (Bromet, Dew & Parkinson, 1990). In a study of 389 married women engaged in blue-collar work in an electronics factory, over half (n=220) of the subjects reported that spillover of stress occurred from either work or family spheres, or both. Of this number, 56% (n=123) reported that spillover went in both directions, 27% said it went from work

to family, and 17% reported stress moving from family to work (Bromet, Dew & Parkinson, 1990).

Role conflicts have been classified as belonging to one of two categories: overload and interference (Voydanoff, 1987). Overload occurs when, during the course of performing multiple roles, time and energy demands exceed supply. Interference takes place when conflicting demands make it difficult or impossible to fulfill all roles. Ahrentzen (1990), in a study of home-based workers, classified work-family interference as being (a) child-related: children demanding attention, needing to be driven to activities, or wanting to use the computer; (b) adult-related: relatives or other adults making demands, for example, requesting childcare services, wanting to talk or be entertained; (c) business-related: receiving work calls after "working hours," or during meals or family time; or (d) self-imposed: wanting to work too many hours, being tempted to play with the children, go outside, or do the housework.

Conflict does not always occur when the roles of provider and family member overlap. Ahrentzen's cross-sectional study of 104 homeworkers found that while 36% of the respondents reported increased role conflict since working at home, about the same number of respondents (37%) reported that role conflict actually decreased. Time played a significant part in role conflict (38%), and conflicts regarding space (26%) were also significant. An interesting finding was that the subjects in her study reported high role conflict *prior* to working at home as the result of lengthy commute and rigid time schedules. Reducing the commute time and allowing for control over the work schedule resulted in less role conflict (Ahrentzen, 1990). McLaughlin's (1981) study of homeworkers determined that for her sample, defining rigid boundaries increased role interference, while Beach (1989) suggested that more fluid boundaries facilitated integration of work and home life (and thus decreased role conflict).

Boundaries and the Home Workspace

Few studies have examined the ways in which individuals and families manage and adapt to role conflicts. Boundary maintenance (Ahrentzen, 1990), role elimination and negotiation (Voydanoff, 1987), and accommodation (Horvath, 1986; Voydanoff, 1987; Beach, 1989) have been described as successful mediators of role conflict.

Boundaries between work and family can be physical in nature, such as a private office that is separate from the family living area; based on established behaviors, such as "Don't bother me while I am at work"; temporal, such as working for a specific time period during which family is not to interfere; or social, such as changing the roles within the family structure to support working at home. Ahrentzen (1990), in her study of homeworkers, explored the overlap between work and

family on these four types of boundaries. The findings indicated that boundaries played a significant part in minimizing role conflict. The most important spatial boundary was having a distinct workspace. The behavioral boundary most frequently cited was eliminating old or initiating new behaviors. Rescheduling of work and/or home activities was reported as an important temporal boundary, and accommodating, or adjusting to, changes in the roles of family members was described as the most significant social boundary employed (Ahrentzen, 1990).

Contradictory findings regarding spatial boundaries were presented by McLaughlin (1981), who determined through her study of 91 female homeworkers that they worked more effectively when no physical boundaries demarcated their workspace. Ahrentzen (1990) hypothesized that because all of the subjects in McLaughlin's study were females and mothers, expectations played a key role in the dissatisfaction with physically bounded workspace. Therefore, the women with separate workspaces expected to work without disruptions from children; but, the reverse proved true. Conversely, those who occupied shared spaces did not expect to work without interruptions, and therefore were more satisfied (Ahrentzen, 1990). Both sets of findings suggest that workspace, even though exclusive, must be accompanied by behaviors which demonstrate respect for personal boundaries. Boundaries, then, are rarely employed in isolation from one another, but act as part of a complex web of physical, behavioral, temporal, and social conditions.

Household Composition and Workplace Strategies

Research suggests that household composition influences the satisfaction with integrated workplace strategies where the home is a designated work location. Most frequently cited are differences in satisfaction as a result of gender. One commonly held belief is that alternative workplace strategies primarily benefit women. In her work with professionals working at home, Olson (1993) discovered that the majority of voluntary participants in work-at-home programs were actually men. Rothman and Marks (1987) further contend that, while flexible schedules were perceived to help women balance work and family lives, they were not sufficiently flexible to achieve this goal. Men, on the other hand, benefited from flextime programs by giving them a greater sense of control over their work lives and "freeing them from the time clock."

Rothman and Marks suggest that, while there were differences in satisfaction with such programs according to gender, the actual factor that most influenced satisfaction was household composition and the degree of family conflict. Their work showed that those employees with the fewest work-family conflicts were more satisfied with the flextime program. Other research, however, indicates that gender influences the degree of conflict between work and home roles, with females experiencing higher conflict than males (Greenglass, Pantony & Burke, 1988; Gurstein, 1991; Izraeli, 1988; Pleck & Staines, 1985; Voydanoff & Kelly, 1984). Crouter (1984) discovered that

mothers of children 12 years and under (but not fathers) reported greater degrees of negative spillover from family to work, suggesting that combining work roles with those of parenting and home-making results in incompatible and impossible demands. Later studies concur with this finding; Zussman (1987), in a study of male engineers at two New England corporations, found that tensions between work and family life were virtually non-existent, and suggested these tensions primarily occurred among working women.

Social Interaction

Remote workers frequently cite social isolation or lack of social interaction as a negative impact of working out of the office (DuBrin, 1991; Huws et al., 1990; Salomon & Salomon, 1984).

One advantage to considering the home workplace as just one of several workplace settings that are part of an integrated workplace system is the possibility to avoid the sense of social isolation associated with working primarily or exclusively from home.

In this context, the nature of one's household composition may also affect the extent to which social isolation is felt working from home. Employees without families or peer support at home may find the workplace system less fulfilling than those with other people sharing their homes. Thus, while single employees may not experience some of the family conflict that employees with families may encounter, they may experience stronger feelings of social isolation.

In general, there is not a great deal of research that has examined the social consequences of working remotely as a function of household composition, or any other variable.

Research Objectives

The purpose of this study was to examine some of the effects of an integrated workplace system, in which employees were provided with the opportunity to choose to conduct their work in several distinct workplace settings, on employee satisfaction, stress and work effectiveness as a function of household composition and type of workspace occupied in the home. The following research objectives were addressed:

- To describe the characteristics of IBM's Midwest Mobility Program, an integrated workplace system, referred to hereafter as the "mobility program."

- To determine the patterns of time and setting use for mobile employees.

- To investigate the main effects of household composition and home workspace on measures of satisfaction, stress, and work effectiveness.
- To discover whether other variables were significant in predicting satisfaction, stress, or work effectiveness.

Methodology

Research Design

The research was organized as a cross-sectional case study within a single organization that had implemented and maintained an integrated workplace strategy for a period of one year. For the purpose of this report, an integrated workplace strategy was defined as a formal workplace program that combined the provision of several different workplace settings with appropriate information technology, management practices and policies, and work process to allow employees to work anywhere, anytime.

We examined, in particular: (a) the influence of household composition on employees' overall satisfaction with the workplace system; and (b) whether the presence of a dedicated room or dedicated area within a multi-purpose room influenced overall satisfaction with the workplace strategy and with work effectiveness, stress, and job satisfaction. The influence of additional variables such as gender, number of hours worked per week, work status of spouse or partner, and job category, were also examined.

It is important to note that this study was a "snapshot" in time. Since the data was collected and analyzed, changes have occurred in the system which are not reflected here.

Definitions of Research Design Factors

The Mobile Workplace

The study focused on what IBM, the company which was the research site for this study, called its *Midwest Mobility Program* (see description, below).

Household Composition

While "household composition" or "family status" brings many different pictures to mind (e.g., young couple with or without children, single-parent homes, empty nest families), for the purpose of this study we used five primary distinctions (see Table 1).

Table 1: Household Composition

Single	Respondent not married/partnered; no children
Single-parent	Respondent not married/partnered; children of any age
Pre-school	Respondent married/partnered; youngest child under 6
School-age	Respondent married/partnered, youngest child 6 or older
Adults-only	Respondent married/partnered; no children under 18

Because the number of some classifications were quite small, it became necessary to combine several categories; in particular, single households (single or divorced, no children) with adults-only households. The distinction thus became whether the respondent had no children, had pre-school-age children, or had school-age children.

Home Workspace

Dedicated Rooms

At the onset of the new workplace strategy, planners informed employees that they would no longer be provided with a personal assigned workspace at a central office. Employees were encouraged to create an alternative workspace at home to supplement their work areas at customer locations. Many employees were fortunate to have adequate space within their homes which allowed them to establish a home office in a room separate from the rest of the house, and used primarily for work purposes. This arrangement was termed, for the purposes of this study, a *dedicated room.*

Dedicated Areas

Other employees established a home office area in a room serving other functions, and was thus denoted a *dedicated area.* Dedicated areas allowed the user to leave work in place, even though the room had other purposes.

Non-Dedicated Area

A third category was identified as a *non-dedicated area*, or an area in a room used primarily for other functions and which required that the work area be set up and dismantled for each work session. Because only two out of 105 respondents described their home workspace as a non-dedicated area, they were not included in the statistical analysis.

Table 2 illustrates the collapsed research design, reflecting two levels of home workspace: dedicated room and dedicated area; and three levels of household composition: no children, pre-school children, and school-age children. The number of mobile employees in each category is indicated.

Table 2: Household Composition by Home Workspace

	Household Composition			
Workspace	No Children	Pre-school Children	School-age Children	
Dedicated Room	30	13	21	64
Dedicated Area	7	15	17	39
	37	28	38	**n=103**

Site Selection

The site selected for study, IBM in Indiana, introduced the Midwest Mobility Program in 1992-1993. Approximately three hundred employees participated in the program at the time the study was conducted (since then more than two thousand employees participate in the program in a ten state midwest geography and over twenty thousand employees total). These employees represented a cross-section of household compositions, home workspace types, and job categories.

Perhaps the most notable characteristic of the site selected for the present research is that this mobile workplace implementation occurred *involuntarily*. In contrast, participation in the over forty other mobility programs during the same time period was voluntary. In the case of IBM Midwest, everyone was required to participate, with virtually no exceptions.

Sample Size and Selection

The total population for this study was 282 employees who were part of the mobile workplace implementation in May of 1993. The respondent group consisted of 105 customer-related employees working in three general areas: marketing, technical services, and management.

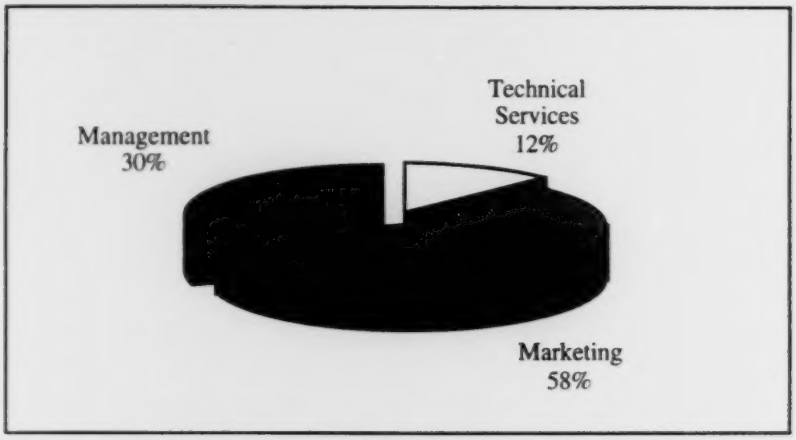

Figure 1: Job categories of customer-related employees.

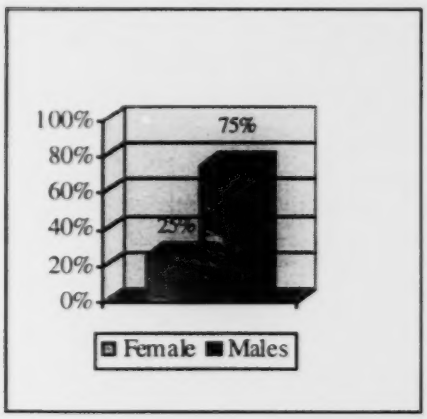

Figure 2: Gender of survey respondents.

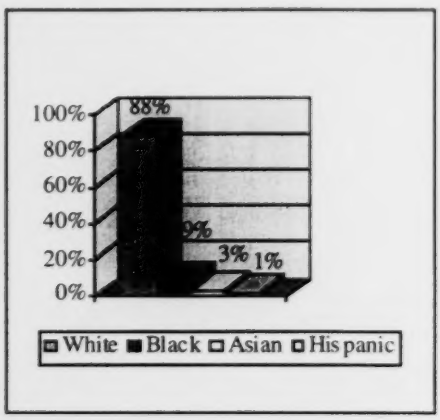

Figure 3: Ethnicity of survey respondents.

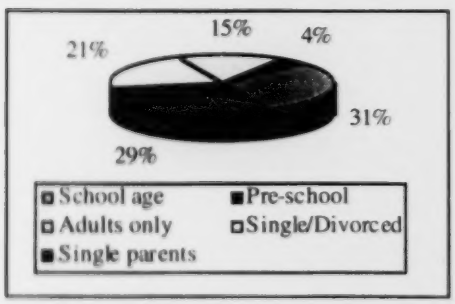

Figure 4: Household composition of survey respondents.

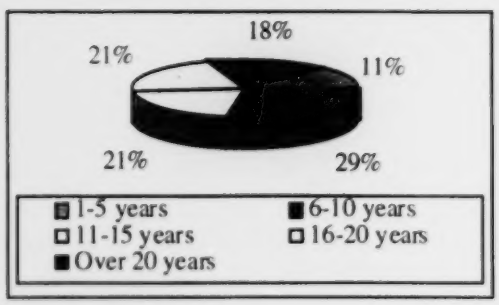

Figure 5: Years with IBM.

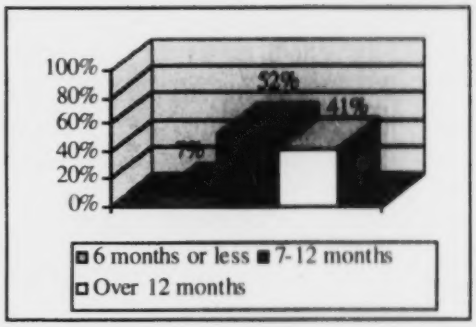

Figure 6: Time in Mobility Program.

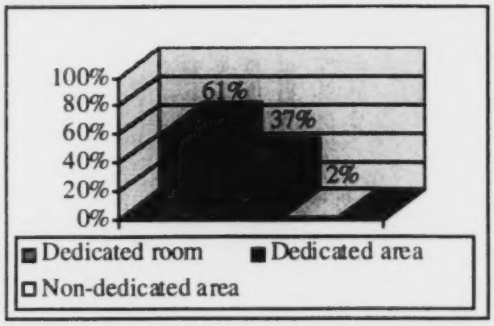

Figure 7: Home workplace.

The typical mobile worker was:

- Male (75%).
- In marketing (58%).
- White (88%).
- Married (81%).
- A parent (60%).
- With IBM for 6-10 years (29%).
- Aged 30-39 (48%).

Data Collection

Five data collection methods were employed in this study:

1. Surveys were distributed to all mobile employees in Indiana.

2. Interviews (both face-to-face and telephone) were conducted with a small number of survey respondents who supplied names and telephone numbers.

3. Observations of activities and use patterns took place at the Indianapolis Productivity Center.

4. Photographs of representative samples of home workspaces, the Productivity Center, and customer sites were taken by the mobile employees with disposable cameras, returned to, and developed by, the researcher.

5. Archival data, consisting of company guides, human resource information, and cost data was investigated.

Multiple data collection methods were employed in order to provide a more complete and accurate picture of the entire workplace innovation.

The Mobile Workplace Survey

The Mobile Workplace Survey was sent out to two hundred eighty two employees. The response rate was 35% (n = 105). A complete survey can be found in Appendix A.

The survey consisted of six parts:

Part I: Background Information.

Part II: Work Activity—hours and settings of work, changes in work hours since the mobility program began, which setting was most conducive to productivity, what features of the setting made the respondent most productive.

Part III: Work Environment—job satisfaction, job stress, and effectiveness as they relate to the mobility program, satisfaction with the work environment at the Productivity Center, and satisfaction with the work environment at home.

Part IV: Mobility Program—the impact of the mobility program on features of work life and features of home life, satisfaction with the *opportunity* to participate in planning and evaluating the mobility program, and satisfaction with *actual* participation and evaluation.

Part V: Home Life Characteristics—changes in home and family life since beginning the mobility program, and the *level* of change.

Part VI: Additional Comments—open-ended questions about desired changes in the mobility program, the home workspace, and the Productivity Center.

Interviews

Nine face-to-face interviews and ten telephone interviews were conducted to probe responses to the Mobile Workplace Survey. The face-to-face interviews were tape-recorded with participants. Questions concerning typical activity patterns, loss of social and business interaction, and the work-family interface were discussed at length (see Appendix B).

Observations

Observations of work activity, patterns of interaction and occupancy rates were conducted during a two-day visit to IBM's Indianapolis Productivity Center. These unstructured observations occurred at random times throughout the two-day period. Occupancy of the Productivity Center was noted each time. Because observations occurred infrequently and at random, no systematic analysis was conducted.

Photographs

In an attempt to gain a better understanding of the physical environments in which mobile employees work, disposable cameras were distributed to a subset of survey respondents (n=9). Respondents were provided with a location identifier sheet (see Appendix C), and were instructed to take multiple photographs of home work areas, Productivity Center work areas, customer work areas, and any other relevant work areas. Respondents represented different work groups (technical service, marketing, and management), different household compositions, and different home workspaces.

Archival Data

The company provided several types of archival data for analysis. A "Telecommuting Implementation Guide" was reviewed for methodology, coverage, planning features, cost impacts and implementation schedule. A rich source of archival data was found in two series of E-mail responses containing more than seventy entries each. The responses were answers given by mobile employees to the open-ended question "How's it going?", posed by a company general manager. These responses were analyzed and served, along with relevant literature, as the basis for the survey items.

Workplace Strategy Overview

IBM is one of the largest producers of computers in the world, and includes among its products mainframe processors, personal workstations, software, and peripherals. However, the company has seen tremendous losses and headcount reductions over the past years—$6.9 million and 125,000 people, respectively, in 1992 (Hoover's Handbook of American Business, 1994). Like many IBM offices, the Indiana offices were faced with financial pressures to reduce costs and become more responsive to customers without reducing the size of the workforce. In the Midwest one element of IBM's strategy to achieve this goal was to implement an integrated workplace system, which they called the *Midwest Mobility Program* (referred to hereafter simply as the "mobility program.")

In March 1993, IBM Indiana was given a chance to save 50 positions if other costs could be reduced instead. A team of approximately 20 people, lead by the Business Operations Manager, the Information Technology Manager, and a Senior Consultant, put together a plan to move all customer-related employees in technical services, marketing, and management positions[1] out of costly real estate and into a program consisting of a variety of work locations. The program allowed employees who spent a large portion of their time (70%) with clients to work the remainder of their time in home offices and a central office, called the Productivity Center, with shared workstations and offices. In addition, employees were free to work in any number of "found"[2] workspaces, including IBM drop-in sites, restaurants, hotels, airports, airplanes, and automobiles.

Again, the goal of the project was to save 50 positions by reducing other costs. This was accomplished by reducing the amount of office space necessary to house these employees. The program reduced real estate and other fixed asset costs to the organization by incrementally increasing the person-to-desk ratio from the traditional 1:1 to 4:1, and finally 8:1. This was accomplished by replacing assigned workstations with shared, unassigned non-territorial workstations. The actual workstations themselves remained unchanged.

Everyone was required to participate, with no exceptions. The incentive to save 50 positions was a strong motivator for accepting the program.

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[1] The number of individual job titles was reduced to these three basic groups based on similar job characteristics and demands.

[2] "Found" workspaces are informal work areas that are not originally designed into a system of workplace settings, but arise as a result of work need or employee desire.

It is important to note that this study was a "snapshot" in time. Since the data was collected and analyzed, changes have occurred in the system which are not reflected here.

Productivity Center

Workspace and Technology at the Productivity Center

The Productivity Center housed an administrative staff and site support services (word-processing pool, information systems, finance, mail, and printing services). Mobile employees were expected to spend approximately one-half to one complete day a week in the Productivity Center. When in the office, employees had access to shared unassigned working spaces, including individual and group workstations, private group offices, conference rooms, copy/mail/print service rooms, and fax machines.

Client-oriented employees and managers shared offices and workstations at a 8:1 persons-to-desk ratio. Each workstation or office was equipped with a chair, a desk, a file drawer, and a standard array of technology tools including either a PC or an adapter linking their ThinkPad[3] to the office LAN, a monitor, and a telephone.

An important component of the telephone system was the customer service center (CSC), which functioned as a switchboard. In the unassigned workstations and offices, if the phone rang and was not answered in three rings, it was transferred to the CSC, where an operator either paged the IBMer being called, transferred the caller into phone-mail if the caller wished to leave a message, or located an alternative employee to resolve the customer's question or problem.

The I/S (information systems) Platform was a standard array of applications that were available to employees at the Productivity Center, as well as from alternative work locations (e.g., home, customer sites, etc.). Printers were distributed throughout the Productivity Center.

Table 3 summarizes the workspace and technology available to mobile employees at the Productivity Center.

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[3] The ThinkPad is an IBM produced laptop computer; laptops were provided in November, 1993.

Table 3: Workspace and Technology in the Productivity Center

- Shared unassigned workstations for individuals.
- Shared unassigned workstations and rooms for teamwork.
- Shared unassigned rooms for manager-employee meetings.
- Host token ring connector and LAN.
- Telephone system (voice mail, call forwarding, conference calling).
- Monitors on desks in unassigned workstations and rooms.
- Laser printers throughout floor.
- Mailroom and supplies.
- Support services (word processing, information systems and finance).

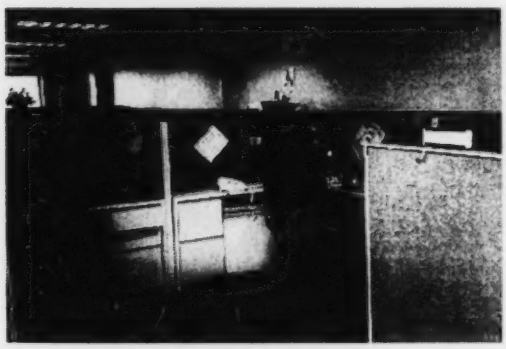

Photo 1: Productivity Center—Shared Unassigned Workstation

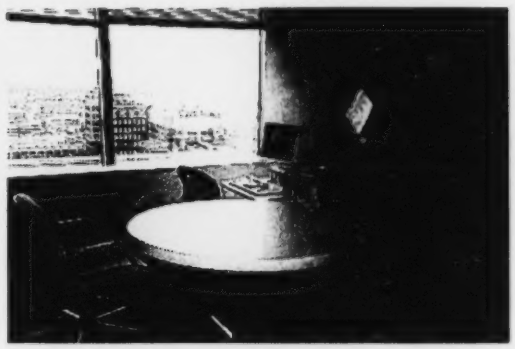

Photo 2: Productivity Center—Shared Unassigned Team Room

Customer Sites

The customer sites consisted of large corporations, government agencies, and hundreds of smaller businesses. The actual workspace provided to the IBM employee varied considerably depending on the company furnishing the space. For example, in some customer sites, IBMers were provided with a private office, telephone, computer, fax, and printer. In other customer sites, they were housed in a cramped, windowless room with broken-down furniture, and shared the space with different vendors. Most had some combination of the two extremes described. The crucial point is that no standard prevailed.

Home Workspace

The final primary setting in the mobility program was the home workspace. When employees were initiated into the program, they were given office furniture (if available, and usually consisting of a desk, a chair, and a 2- or 4-drawer file cabinet), a computer (initially a PC, and in November 1993, a ThinkPad), a high-speed modem, and a multi-line speaker phone. Additionally, two phone lines were installed in each employee's home to accommodate data and voice transmissions. Initially, employees were given an equivalent cash allowance if they wished to purchase their own equipment for home use, rather than take home their current equipment. This cash option was dropped after the Indiana pilot program, since an abundance of furniture was available.

Table 4 summarizes the equipment and technology provided in the home workspace.

Table 4: Equipment and Technology in the Home Workspace

- ThinkPad
- Telephone
- Two separate phone lines for voice and data
- Internal fax/modem
- Dial-in access
- Voice mail
- I/S Platform
- Furniture (if available) - desk, chair, file cabinet
- Dot matrix printer (if available)
- Alphanumeric pager (optional)
- Cellular phone (with manager approval)
- CD ROM (with manager approval)

Because the employees had access to a number of workplace settings, lack of space at home or appropriateness were not valid excuses for not taking part in the mobility program. It was assumed that employees who preferred not to work at home (for whatever reason) could easily perform work tasks in other locations.

Photo 3: Home Workspace—Dedicated Area

Photo 4: Home Workspace—Dedicated Room

Photo 5: The Portable Office in a Briefcase

Photo 6: Home Workspace—Dedicated Room

Financial Impact of the Mobility Program on the Organization

IBM Indiana was able to realize significant cost savings by implementing the mobility program. IBM now occupies about 37% of the space it once did. Person-to-desk ratios changed from 1:1 to 8:1 under the mobility program, while office space went from 240,000 s.f. to 88,500 s.f (a savings of 151,500 s.f.). New costs generated by the program, such as laptop computers, printers, training and telecommunication charges, were factored into the savings. Table 5 summarizes the savings to the organization.

Table 5: Annual Cost Savings Associated with Mobility Program

	Projected	Actual
Millions of dollars saved	1.5-2 M	3.2 M
Percent derived from real estate	90%	70%
Percent derived from infrastructure*	10%	30%

* Sale of furniture and assets, depreciation of equipment, reduced support staff, reduced utility costs and supplies, and elimination of free parking

Mobility Program Use

Most mobile employees described beginning the day by working for at least a brief time in their home workspace. They would typically check messages, update outgoing telephone messages, and conduct telephone calls. Anywhere from thirty minutes to two hours later the mobile employee would then drive to one or more of the customers' sites for the day (or part of the day) and would typically stay there until returning home. Most likely, after a break for dinner, time with the family, or doing some home chores, the mobile employee returned to the home workspace to record the day's activities, to write proposals, and to dial in to the telecommunications system in order to communicate with fellow IBMers.

For client-related employees, the Productivity Center acted as a service center or "after hours" work location. A common factor influencing the use patterns of the Center was the availability of parking in the downtown area. Many employees arranged their visits around non-peak parking times, such as after normal working hours. Others would simply stop off on the transition from home to the client site to check in or pick up printed materials.

Mobile employees were asked to report the typical number of times they worked in a given setting each week and the typical amount of time spent in the setting each time it was used. Figure 8 illustrates the mean number of hours that mobile employees worked in each setting. As shown, the average employee worked about sixty hours per week, and spent roughly 35% (21 hours) of the time in their home workspace, followed by 27% (16 hours) at their customers' sites.

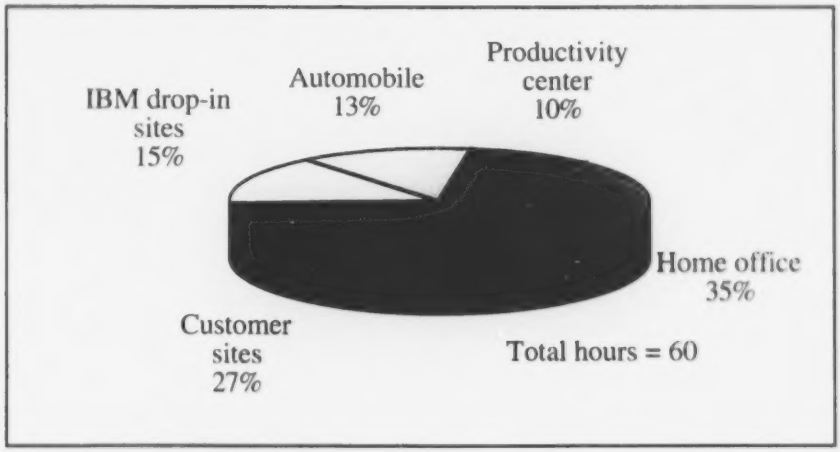

Figure 8: Hours worked per week by setting.

There were no significant deviations from the above pattern according to household composition or home workspace. However, employees with pre-school children tended to work more at home than other employees (see Figure 9).

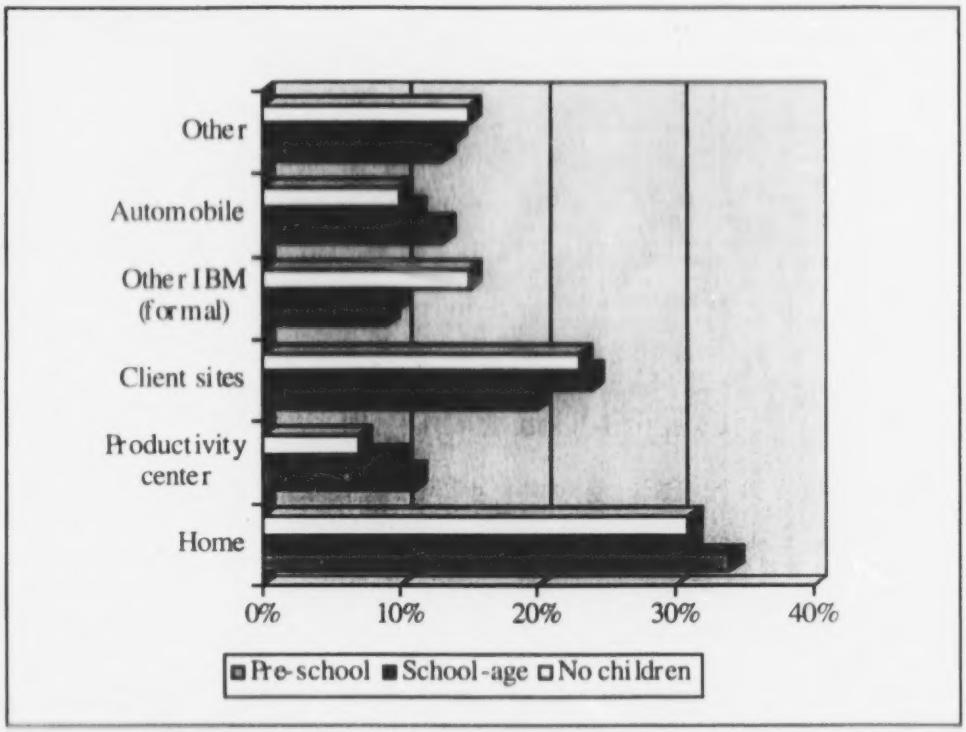

Figure 9: Work patterns by household composition.

In addition, employees were also questioned as to the activity which typically occurred at each of the settings. Table 6 summarizes their responses. In general, work requiring more concentration or privacy (e.g., customer calls, one-on-one IBM calls, planning) were performed in the home office workspace. Employees used the customer sites and the Productivity Center more often as a means of conducting meetings and other tasks requiring interaction.

One of the most general statements which could be made about the survey respondents is that they worked a great deal. More than 87% reported working more than 40 hours per week. Fifty-eight percent said they work more hours now than before, but whether this change was due to the mobility program or to other organizational changes could not be determined.

Table 6: Activities That Take Place in the Three Primary Settings of the Mobile Workplace

Customer Sites*

- Planned meetings
- Administration of projects
- Taking care of customer business and socializing with customers

Productivity Center

- Planned meetings
- Video-conference meetings
- LAN research
- Phone work to schedule appointments, check and reply to voice mail
- Mail pick up and delivery
- Print-out pick up

Home Workspace

- Planning and administration
- Phone calls with customers one-to-one
- Phone calls with other IBMers one-to-one
- Conference call meetings

* Vary depending on industry, facility, and relationship

User Response to the Mobility Program

Satisfaction with the Mobility Program

The mean score for satisfaction with the mobility program was 3.905 on a 5-point scale, with 5 equal to "very satisfied." Seventy-six percent (n=79) were somewhat or very satisfied with the mobility program, 11% (n=12) rated their satisfaction as neutral, and 13% (n=14) reported being somewhat or very dissatisfied with the mobility program.

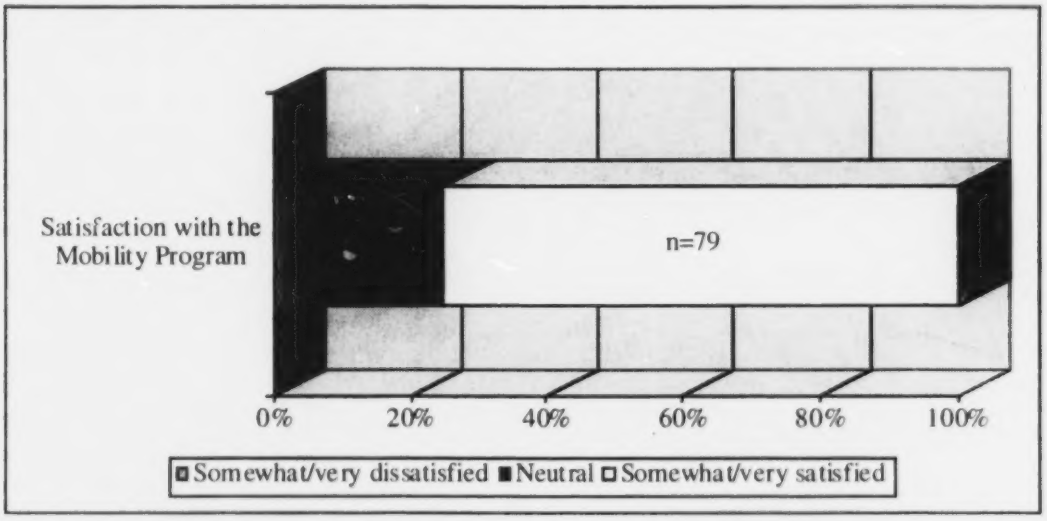

Figure 10: Satisfaction with the Mobility Program.

There were no statistically significant differences in satisfaction with the mobility program as a function of household composition or home workspace.

Gender, however, was a significant factor in satisfaction with the mobility program. Females (n=26) had an overall mean score of 4.308, while males (n=79) scored 3.772 ($F=5.280$; $df=1,103$; $p=.0236$).

More than one mobile employee volunteered during interviews that she or he would not go back to the office if the mobility program were dismantled. One female respondent said "I would leave first; so would others... it's the best thing that happened to my career, and my life." Others were not so satisfied. One mobile employee spoke of the difficulties communicating with his manager; he said their communication styles differed, which was a challenge before mobility, but had become even more difficult since opportunities for informal contact were lacking. Messages that weren't meant to alarm suddenly became, as he put it, "a big deal."

Respondents were asked what they liked most and least about the mobility program. The biggest benefits to mobility centered around the increased control over ones own work and schedule. Negative issues concerned the decrease in interaction with co-workers and spillover from work to home. Table 7 details the most popular features of the mobility program, while Table 8 summarizes what employees liked least about the program.

Table 7: What Mobile Employees Liked Most About the Mobility Program

	%	n
• Flexibility, freedom and independence	38	40
• More effective use of time and more productive	17	18
• Ability to concentrate and fewer interruptions	11	12
• Reduced commute	10	10
• More time for family	9	9
• Having the tools at home	8	8
• Casual dress (more relaxed)	5	5
• More time for customers	2	3

Response: n=105

Table 8: What Mobile Employees Liked Least About the Mobility Program

	%	n
• Lack of social interaction	30	24
• Inadequate equipment and technology	19	15
• Work and home life interference	18	14
• Lack of professional interaction	10	8
• Working too much	9	7
• Having to go downtown and paying for parking	5	4
• "Career" has become a "job"	3	2
• Administrative burden	3	2
• No reimbursement for home workspace	3	2
• Don't care for it at all	1	1
• Freedom	1	1

Response: n=80

Satisfaction with the Productivity Center

Essentially, the Productivity Center was considered to be highly functional but devoid of any aesthetic appeal. Comments on the survey included such things as, "The place looks shoddy..." and, "Couldn't we have some art work to liven things up?" One of the respondents proclaimed that the difficulty in finding (reasonably-priced) parking downtown made going to the center "totally unproductive." The need to pick up mail and print-outs was the chief motivation for most respondents who went to the Productivity Center.

Table 9 summarizes the changes that employees would like to see made to the Productivity Center.

Table 9: Changes to Productivity Center Desired

	%	n
• Free, or cheaper parking	20	15
• Improve existing equipment and technology	18	14
• Additional equipment and technology (docking stations, scanners, and desktop access)	17	13
• Move out of downtown	12	9
• Standardize and upgrade software	11	8
• More storage, desks	9	7
• More LAN, token ring connections	8	6
• Improve management at Productivity Center	5	4

Change: n=100

Satisfaction with Home Workspace

In general, the respondents described the home workspace as being the best place for doing work requiring high concentration, such as planning, paperwork, and telephone and teleconference calls. Employee comments suggest that the type of workspace at home and the family composition influenced how employees viewed the home setting, however. For example, one mobile worker who was married, had school-age children, and occupied a corner of the den behind the piano, described the home setting as quite disruptive. The den was the only means of entering the back yard, and so if he was working when the children wanted to go outside, they would have to interrupt him. He alleviated much of the problem by developing certain rules and parameters while he was working at home. He initially installed a lock on the door of the den to keep his children from interrupting him. Once a schedule was established whereby the kids knew when he was working, he ceased having to use the lock.

Two employees reported having non-dedicated areas, and for them, moving a workspace into the home created major problems; for example, one of them had a large number of children, no extra space, and used the kitchen table for a desk. This mobile worker found that working at home was synonymous with interruptions and distractions, and he understandably preferred working at the Productivity Center.

Mobile employees were asked what changes they would like to make, or see made, in their home workspace. The most frequent request was more storage, followed by letter quality printers. Table 10 shows the responses received.

Table 10: Changes to Home Workspace Desired

	%	n
• More file storage	21	22
• Letter quality printer	16	17
• Better furnishings	13	14
• More technical support, telecom equipment	12	13
• Need dedicated room (with doors)	11	12
• Larger room	11	11
• Better ambient conditions (heat, light, air, noise)	9	9
• Reimbursement for workspace, tax write-off	5	5
• Help in organizing home office	2	2

Change: n=100

Work Effectiveness

Most Productive Work Hours

The most productive work hours for all employees tended to be in the normal working hour range of 8 a.m. to 4 p.m. However, almost 40% of the 105 respondents found "non-traditional" hours to be productive (see below). Employees with school-age or pre-school children were more likely to report working non-traditional hours than employees without children.

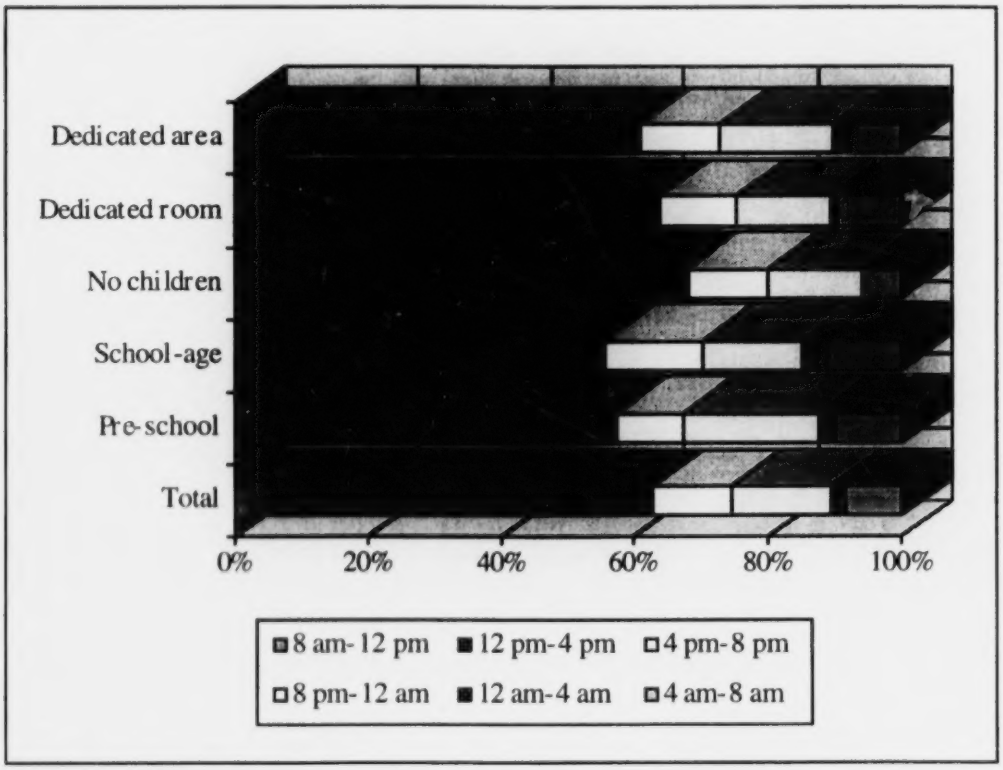

Figure 11: Most productive work hours.

Most Productive Work Setting

The most productive work setting was reported to be the home environment. Users cited fewer interruptions and better concentration at home as explanations for why they preferred this environment.

Surprisingly, there were no significant differences for household composition, home workspace, or gender.

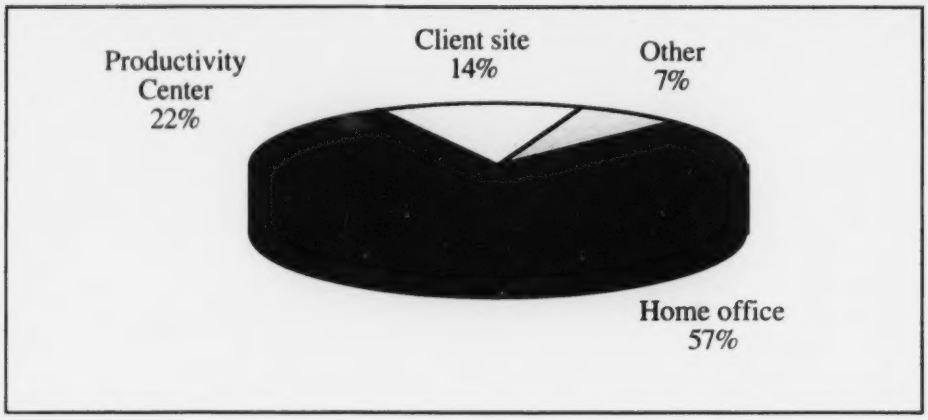

Figure 12: Most productive work setting.

Overall Work Effectiveness

The mean score for overall work effectiveness was 3.597 on a 5 point scale where 5 = much better; 3 = no change; 1 = much worse. Approximately half of the respondents (52%, n=55) reported that their overall work effectiveness was better or much better, 30% (n=31) were neutral about the impact of the mobility program on their overall work effectiveness, and 18% (n=19) rated their overall work effectiveness as worse or much worse.

No statistically significant differences emerged regarding household composition or home workspace.

During interviews, a number of employees noted that they felt they were much more effective and productive as a result of the flexibility found in the mobility program. But, they named the number of hours worked and the ability to work longer hours more easily, rather than the choice of locations, as the important factors in determining overall work effectiveness.

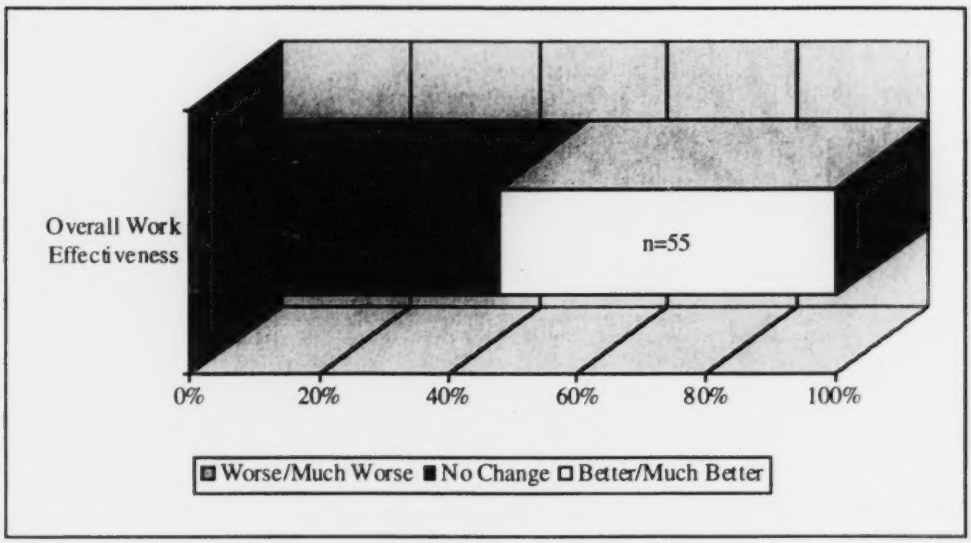

Figure 13: Overall work effectiveness.

Satisfaction with Work Effectiveness at the Productivity Center

The overall mean score for satisfaction with work effectiveness at the Productivity Center was 3.464. Sixty-five percent (n=64) of the respondents rated their satisfaction as somewhat or very satisfied, 16% (n=16) were neutral, and 18% (n=18) were somewhat or very dissatisfied. No significant differences were found as a function of household composition or home workspace.

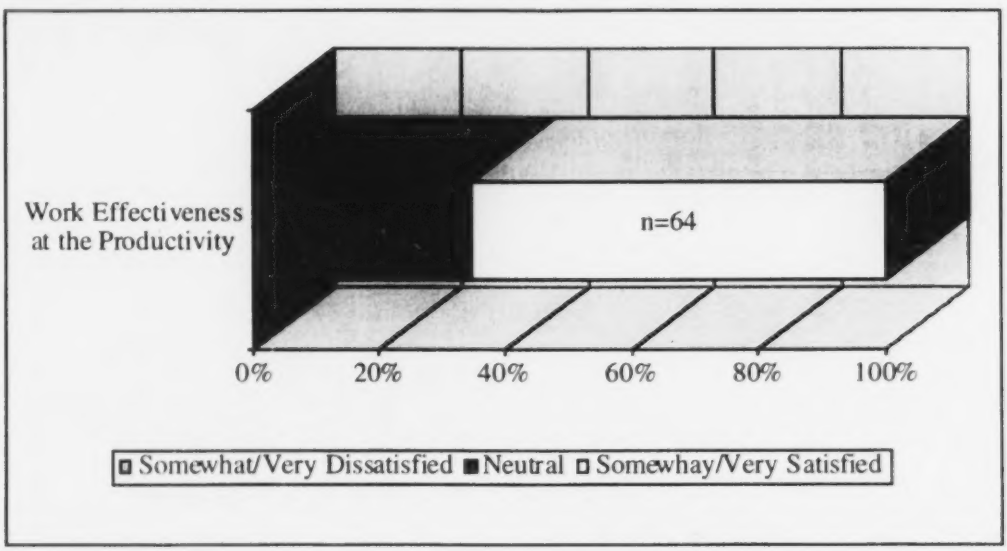

Figure 14: Work effectiveness at the Productivity Center.

Satisfaction with Work Effectiveness at Home

A different picture emerged regarding satisfaction with work effectiveness at home (see Table 11). The overall mean satisfaction score was 4.255, substantially higher than the overall mean for satisfaction with work effectiveness at the Productivity Center ($\bar{x}$ = 3.464). Eighty-three percent (n=81) of the respondents rated their satisfaction with work effectiveness at home as somewhat or very satisfied; 12% (n=12) were neutral; and 5% (n=5) reported being somewhat or very dissatisfied. There were no significant differences for type of home workspace. Mobile workers without children had significantly higher ratings of satisfaction with work effectiveness at home than did those with pre-school children.

Table 11: Satisfaction with Work Effectiveness in the Home Workspace

	Household Composition			
Workspace	No Children	Pre-school Children	School-age Children	
Dedicated Room	4.48 (28)	4.00 (13)	4.43 (20)	4.36 (61)
Dedicated Area	4.42 (6)	3.96 (13)	4.22 (16)	4.16 (35)
	4.47 (34)*	3.98 (26)*	4.33 (36)	**n = 96**

*F = 2.684; df = 2,90; p = .0115

Scale: 5 = Very satisfied; 3 = Neutral; 1 = Very dissatisfied

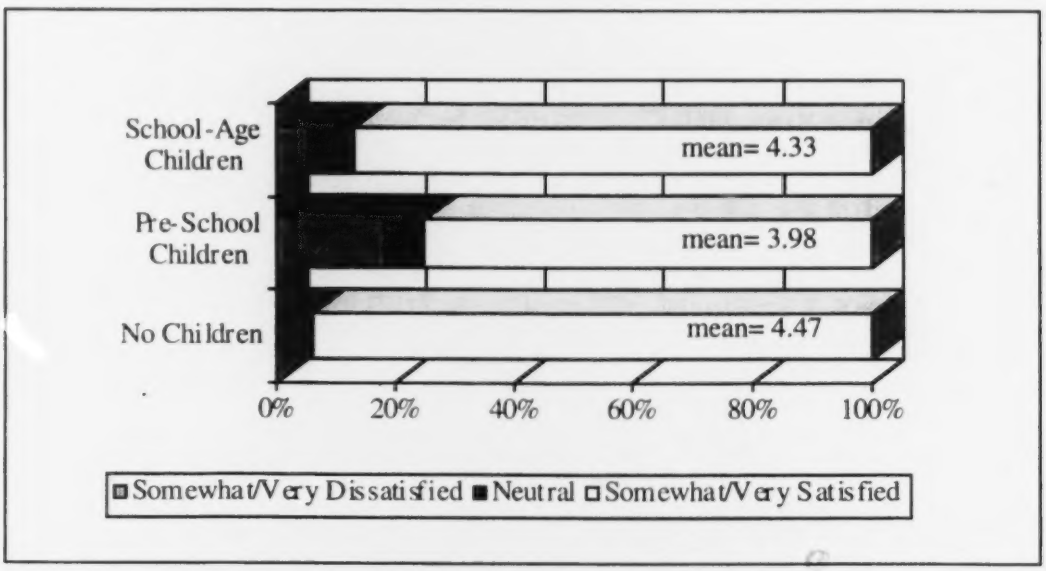

Figure 15: Work effectiveness in home workspace.

Analysis of the secondary variables and their impact on satisfaction with ability to work effectively at home uncovered significant differences as a function of family size. Mobile employees who lived alone (n=15) received a mean score of 4.633, while those employees who were members of families of 2 or more (n=83) scored 4.187 ($F= 4.415$; $df=1,96$; $p=.0382$).

Communication

Employee feedback indicated that there were two important components of communication: the ability to communicate about work with co-workers (professional communication) and the ability to socialize with co-workers (social communication).

Professional Communication

The mean score for impact on professional communication was 2.038 (5 = much better, 3 = unchanged, 1 = much worse). Over 77% (n=81) of the respondents reported that professional communication at work was somewhat or much worse since the mobility program began, while slightly over 14% (n=15) reported professional communication as unchanged. Nearly nine percent (n=9), however, rated professional communication as better or much better. No significant differences as a function of home workspace or household composition were found.

Social Communication

Social communication at work earned an overall mean score of 1.60. (5 = much better, 3 = unchanged, 1 = much worse). Eighty-eight percent (n=93) of the mobile workers rated their ability to socialize with their co-workers as worse or much worse, 9% (n=9) reported it as unchanged, and 3% (n=3) said it was better or much better. There were no significant differences found as a function of household composition, home workspace, or the secondary variables.

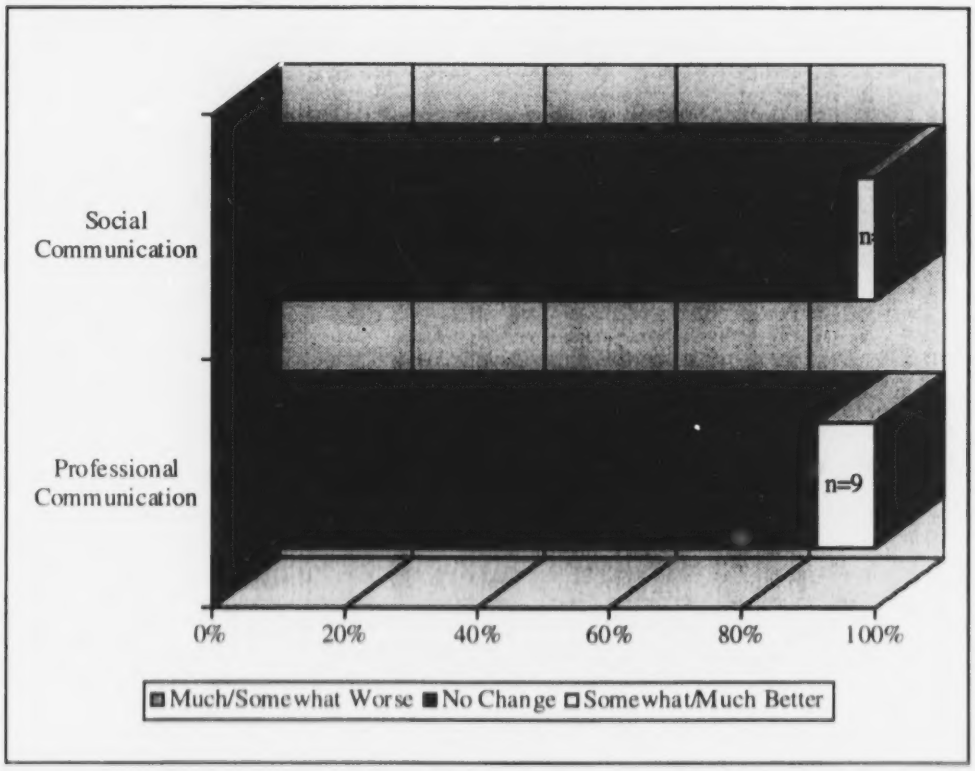

Figure 16: Impact of mobility on communication.

Regarding the loss of social interaction, one mobile worker explained that "Things used to be more informal. We'd meet in the halls, go out for lunch or drinks after work...it was so spontaneous. Now every meeting must be planned, so we don't meet as often." A colleague asserted that for him, it was not the loss of social interaction, but the loss of informal business communication which he missed the most. He stated that the problem-solving process had been greatly lengthened due to the increased time it took to connect with the right resource. When questioned about the tools used to communicate, another mobile employee said that while he used voice mail and e-mail systems extensively, it often took so long before getting a response that it had increased the response time to customers.

Job Satisfaction

The mean score for job satisfaction was 3.932 (N=105). Sixty-two percent of the respondents (n=65) said they were somewhat or very satisfied with their jobs, 21% (n=22) reported being neutral about their jobs, and 17% (n=18) said they were somewhat or very dissatisfied with their jobs. Job satisfaction scores compared by household composition and home workspace were not significantly different.

Several of the secondary variables analyzed did uncover critical differences for job satisfaction. An interesting finding was that employees who had been participating in the mobility program for *more* than 12 months had significantly lower scores for job satisfaction than did those who had been participating for *less* than 12 months (F= 5.621; df=1,103; p=.0196). Of 105 respondents, 41% (n=43) had been participating for more than 12 months, and had a mean score for job satisfaction of 3.748, while 59% (n=62) had been participating for less than 12 months, and had a mean score for job satisfaction of 4.059.

Also significant was gender, with females scoring higher ($\bar{x}$ = 4.135, n=26) than males ($\bar{x}$ = 3.865, n=79) for job satisfaction (F=3.180; df=1,103; p=.0775).

Although scores for job satisfaction indicated fairly well-satisfied employees, comments provided during interviews depicted some dissatisfaction. One employee, arguing that he spoke for many others, said that the job was not as fun as it used to be. Some employees explained that as a result of the reorganization, and concurrent downsizing, they perceived the company as being less committed to employees, and therefore had reduced their own sense of commitment to the firm. One mobile employee said he had "quit caring so much about work." Others, however, said the mobility program was the best thing that ever happened to their career. They offered that their newly-found sense of personal empowerment, of having to be responsible for a much wider range of activities, gave them a profound sense of job satisfaction.

Job Stress

Job stress was evaluated through respondents indicating their level of agreement with statements about stress in their jobs. The overall mean was 3.769 on a 5 point scale where 5 = strongly agree and 1 = strongly disagree. Forty-seven percent (n=49) of the respondents indicated that they considered their job stress to be high or very high, 34% (n=36) reported it as medium, while 19% (n=21) said their job stress level was low or very low. While differences in home workspace were not significant, there were significant differences as a function of household composition. The mobile employees with no children had significantly lower scores (less stress) than those with pre-school children.

Table 12: Job Stress Reported by Mobile Employees

Workspace	*Household Composition*			
	No Children	Pre-school Children	School-age Children	
Dedicated Room	3.59 (30)	3.93 (13)	3.78 (21)	3.73 (64)
Dedicated Area	3.77 (7)	3.79 (15)	3.87 (17)	3.82 (39)
	3.63 (37)*	3.86 (28)*	3.82 (38)	**n = 103**

*F = 1.703; df = 3,101; p = .0310

Scale: 5 = Very high stress; 3 = Medium stress; 1 = Very low stress

Five other variables yielded significant differences in regard to job stress. Analysis by marital status showed that mobile employees who were divorced had lower job stress scores ($\bar{x}$ = 3.372, n=11) than those who were married or partnered ($\bar{x}$ = 3.840, n=85), with single employees falling between these two groups ($\bar{x}$ = 3.585, n=9), (F=3.389; df=2,102; p=.0376). Family size was also an important predictor of job stress. Those employees who lived alone ($\bar{x}$ = 3.496, n=16) had significantly lower job stress scores than all other family sizes ($\bar{x}$ = 3.819, n=89), (F= 3.816; df=1,103; p=.0535).

In interviews, the most frequent comment regarding stress was about work overload. One mobile employee said that he occasionally found himself working 90-100 hours per week; he said that it was easy to work such long hours in the mobility program, because when he's at home, the work is right there all the time. Another spoke of the work overload and her increasing inability to find enough time to complete home maintenance tasks. These reactions were repeated by a colleague who admitted that he was still trying to figure out how to stop himself from working too much.

Spillover

Forty-six percent of the respondents (n=48) reported that positive or very positive spillover occurred as a result of the mobility program, 40% (n=42) indicated that the mobility program had no impact on the amount of spillover, while 14% (n=15) judged the impact to be negative or very negative. Differences as a function of home workspace and household composition were not significant. A significant difference for work <> home spillover as a function of gender was found, however. Females reported more positive spillover ($\bar{x}$ = 3.615, n=26) than did males ($\bar{x}$ = 3.180, n=79), (F=6.912; df=1,103; p=.0099).

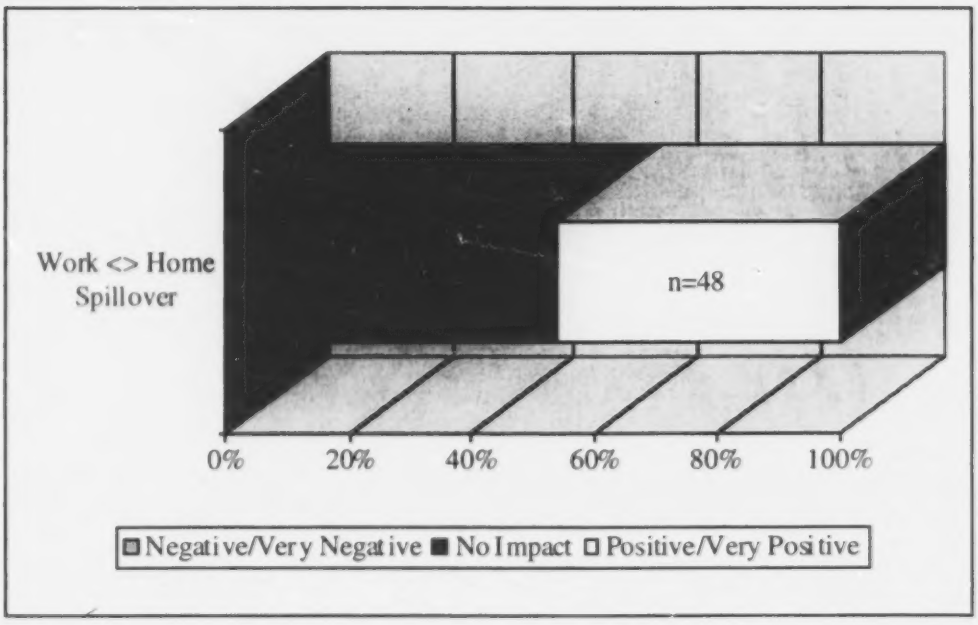

Figure 17: Work <> home spillover.

During interviews, mobile employees shared that among the benefits of the mobility program, positive spillover included having more time for family interactions, having an enhanced family life, and finding it easier to do one's job because of the flexibility. One employee described how he taught his wife and his child to use the computer, and while that temporarily led to conflicts about time, his family had since acquired two new computers. He felt that he and his family were all involved in learning new skills, and it brought them closer together.

Role Conflict

The index for role conflict consisted of three items: (a) distinction between home and work roles; (b) difficulty separating work and home life; and (c) increased tensions at home due to working there. Eighteen percent 18% (n=19) reported the impact of the mobility program on role conflict was positive or very positive, 41% (n=43) of the respondents said there was no impact, and another 41% (n=43) indicated that the impact was negative or very negative.

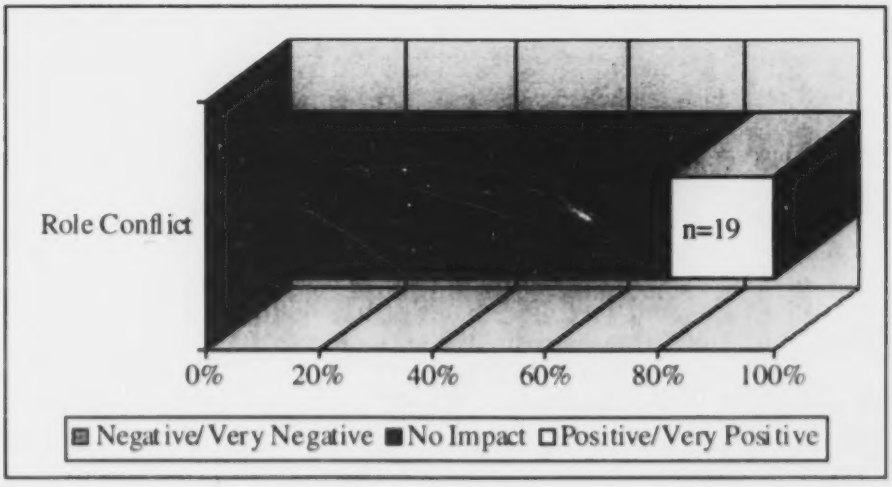

Figure 18: Role conflict.

Gender was a significant predictor of role conflict: males ($\bar{x}$ = 3.338; n=79) experienced higher role conflict than did females ($\bar{x}$ = 3.064; n=26), (F=6.912; df=1,103; p=.0099).

During interviews, some mobile employees complained that there was not enough space in their homes to accommodate work, and that this contributed to interference between home and work roles. Noise from children's activities was a frequent complaint, although one employee said that housekeeping noises (i.e., the vacuum cleaner) also interfered with his phone conversations while working. Similarly, others described having a problem keeping written materials and documents from home and work separate, and an adjunct conflict was that the work area was messier than the standard which prevailed in the rest of the house, disturbing the spouse.

One employee said that he and his wife had some problems at first because she expected him to interact with her when he was working at home, while he wanted to focus solely on work. Other employees echoed his problem, one saying his wife complained "When do I get my husband back?", while another said his spouse asks him "Where's that quality time you promised me?"

Managing Spillover and Role Conflict

Mobile employees were asked to list any new rules or tools they had established at home since they began working there as part of the mobility program. Table 13 summarizes the responses.

Table 13: Home-Work Rules and Tools Established Since the Mobility Program Began

	%	n
• Door closed = DO NOT DISTURB	20	13
• Schedule work time	14	9
• Do not interrupt when working	13	8
• Be respectful of time and space	13	8
• Schedule family time	11	7
• Ignore home phone and door when working	8	5
• Don't touch anything!	6	4
• Family must call employee on business phone line when working	5	3
• Don't have any, need help	5	3
• Children must go to daycare	3	2
• TV watching is limited	3	2

Rules: n = 64

Finally, one mobile employee ingeniously devised a list of reasons why the mobility program should be fun, and the resulting list was distributed through an e-mail message:

Top Ten Reasons Why Mobility Should Be Fun !!!

10. Lunch is cheaper and usually resembles dinner from the night before.
9. The printer is closer and isn't backed-up or jammed.
8. The coffee's fresher, and the brand doesn't upset your stomach.
7. You can impress your friends because YOU have an IBM PC at home.
6. The coffee mugs don't have green fuzz in the bottom.
5. You have to keep your desk clean or your spouse will.
4. Now the neighbors really wonder what you do for a living.
3. It gives new meaning to "Business Casual".
2. The chances are better for being the ninth caller for the cash song.
1. When you want something thrown out you don't have to write "TRASH" on it and trip over it for three days before it disappears.

Summary of Key Findings

Work Patterns

- Employees worked an average of 60 hours a week, higher than previously. Roughly 35% was spent working from home and 27% from customer's sites. There were no significant variations as a function of household composition and nature of home workspace. However, employees with pre-school children tended to work more at home than other employees.

- The home office was used more than any other work setting and considered the best place for doing work requiring high concentration. There were no differences as a function of household composition, home workspace, or gender.

- Almost 40% of the respondents found non-traditional hours to be productive; and of this 40%, employees with children were more likely to report working non-traditional hours than employees without children.

Satisfaction with Mobility Program

- Seventy-six percent of the respondents were somewhat or very satisfied with the mobility program; 13% reported being somewhat or very dissatisfied. There were no significant variations as a function of household composition and nature of home workspace.

- While overall satisfaction levels with the mobility program were high for both men and women, women were more satisfied than men.

Work Effectiveness

- Close to 52% of the respondents reported that their overall work effectiveness was better or much better; 18% reported that it was worse or much worse. While employees with dedicated rooms rated their overall work effectiveness somewhat higher than those with dedicated areas, there were no statistically significant differences as a function of household composition.

Professional and Social Communication

- Over 77% of the respondents reported that professional communication at work was somewhat or much worse since the mobility program began; 9% rated professional communication as better or much better.

- Eighty-eight percent of the mobile workers rated their ability to socialize with their co-workers as worse or much worse; 3% said it was better or much better. There were no significant differences as a function of household composition, home workspace, or any of the other secondary variables examined in this study.

Job Satisfaction

- Sixty-two percent of the respondents reported being somewhat or very satisfied with their jobs; 17% said they were somewhat or very dissatisfied with their jobs. No significant differences occurred as a function of household composition or home workspace.

- While overall job satisfaction scores were high, employees who had been participating in the mobility program for more than 12 months had significantly lower scores for job satisfaction (but not necessarily low scores in an absolute sense) than did those who had been participating for less than 12 months. Women also rated job satisfaction higher than did men.

Job Stress, Spillover, and Role Conflict

- Forty-seven percent reported job stress as high or very high; 19% said it was low or very low. There were no significant differences as a function of home workspace, but there were as a function of household composition. Mobile employees with no children reported significantly less stress than those with pre-school children. Married or partnered couples had higher stress scores than divorced or single employees.

- Forty-six percent of the respondents reported positive or very positive spillover (between work and family life) as a result of the mobility program; 14% reported the effect to be negative. Women reported more positive spillover than men.

- Somewhat conflicting with the above findings, 41% of the respondents reported that the impact of the mobility program on role conflict was negative or very negative. Men were more negatively affected than women. Surprisingly, there were no significant differences for the type of home workspace.

Discussion

The level to which household composition and type of workspace at home affected overall satisfaction with the mobility program, overall work effectiveness, job stress, and communication was much lower than we had originally presumed. These two factors, however, appeared to have larger affect on the satisfaction and effectiveness for specific settings, particularly the home setting. In addition, we found that certain variables, such as gender and family size, played an important role in employees' ability to work effectively in the system and how they scheduled their work. Each of these issues will be discussed in more detail below.

Satisfaction with the Mobility Program

Household Composition

Employee satisfaction with the mobility program was relatively constant regardless of household composition. The biggest benefit employees attributed to the program was the flexibility and control over work and scheduling. The program gave them the ability to not only decide where they were going to work, but also when and how. This finding confirms earlier work by Olson (1988), Korte (1988), and Huws, et al. (1990) which found that flexibility was considered to be the main advantage to working in a mobile environment. Our assumption was that employees with children would be more satisfied than those without children because of the flexibility to meet both family and work obligations. Their satisfaction ratings, however, were not significantly different from those of employees without children.

Home Workspace

The type of home workspace also had little impact on employees' satisfaction with the mobility program. Our assumption was that people with a dedicated room to work at home would be more satisfied with the overall mobility program than those with a dedicated area within a multi-purpose room, which was not the case. Respondents' comments suggested, however, that negative spillover between work and family life was more likely when employees working at home only had a dedicated area rather than a dedicated room.

One explanation for why there was not more of a difference as a function of the type of workspace available at home could be that with the variety of spaces provided to the employees they were able to adapt to the system by working in other locations if they felt they did not have the space at home. Examining the work patterns for people with dedicated rooms or dedicated areas revealed, however, that employees in these two groups worked at about the same levels at home.

Gender

A more accurate predictor of satisfaction in our study was gender, with women reporting higher levels of satisfaction with the program than men. This finding contradicts the works of Rothman and Marks (1987), which found that women were more dissatisfied than men with flexible programs. Rothman and Marks, however, examined only *flextime* programs, which exclude flexibility in work location. Flextime programs also often limit flexibility to certain time slots, such as working 7 a.m. to 4 p.m., rather than 8 a.m. to 5 p.m. They found that women often viewed these programs as ineffective in helping them meet family obligations because the programs did not afford them the flexibility they needed to handle family conflicts. Women in the mobility program, however, had much more freedom in scheduling their work.

We can see why women would be more satisfied with the mobility program than they would with a flextime program, but the question still remains: Why would women be more satisfied with the program that men? It could boil down to what people expect to gain from the program. In the study by Rothman and Marks, women were concerned with balancing work and family, while for men, gaining a sense of control over their work was a priority. This difference in priorities may be because females still perform more of the family/household management tasks than males, and thus appreciate and take advantage of the flexibility to manage diverse tasks. This is not to say that employees did not have more control over their work, but women had the additional benefit of being able to handle both work and family needs in a more effective manner.

Length of Time in Mobility Program

We witnessed a very interesting trend with regards to the length of time employees had been participating in the mobility program. Employees who had been in the mobility program for *more* than 12 months had significantly lower scores for job satisfaction than did those who had been participating for *less* than 12 months. It is very possible that employees initially were very excited with the prospect of working flexibly. As time progressed and they began testing the system, they became more aware of the difficulties of mobile work: the lack of social interaction, problems using the technology or getting support for software or hardware problems, work scheduling, time management, or simply overwork. Since in many cases the assumption is that the longer people experience a new approach (and the more familiar they become with it) the more they will like it, this finding deserves further investigation.

Work Effectiveness

When asked what factors contributed most to overall effectiveness, mobile employees mentioned flexibility in working hours and the ability to choose the setting most appropriate to the work at hand. These findings confirm the work of previous researchers who found that most employees engaged in some form of telecommuting or remote-from-the-central-office work combine work at home with work in other locations and settings (Becker, Davis, Rappaport & Sims, 1992; Becker, Quinn, Rappaport & Sims, 1993; Becker, Rappaport, Quinn & Sims, 1993; Christensen, 1988). Gordon (1988) found that most remote workers do work requiring high concentration at home, and return to the office for meetings, presentations, and socializing. Thus, no single setting within a building can provide the right combination of factors (e.g., acoustic privacy *and* support for group interaction).

For the majority of mobile employees, satisfaction with work effectiveness at home was much higher than satisfaction with work effectiveness at the Productivity Center, in spite of the inconvenience of not having similar levels of technology at home. This may predict a shift in preference for a more *home-like* atmosphere in the office which could be interpreted through design and furnishings.

Household Composition

The overall work effectiveness in the mobility program was rated about the same by families with and without children. This was also true of employees' satisfaction with their effectiveness at the Productivity Center and client sites. As would be expected, however, employees with families had a more difficult time working at home. Satisfaction with work effectiveness at home decreased as family size increased (e.g., employees with four children reported their satisfaction with work effectiveness at home as less than a employees with only one child). In households with children, employees had to work around family distractions and schedule their work around family schedules. This predictably became more difficult to do as the number of people in the family increased.

If employees with children had a more difficult time working at home, then why was their satisfaction with the program about the same as employees without children? One hypothesis is that these employees found a different place to work, such as the client sites and the Productivity Center. This ability to easily substitute one setting for another is something that is unique to an integrated workplace strategy where people have a variety of settings that they can work from according to need. An analysis of the work patterns shows that these employees did tend to work

at the Productivity Center a greater percentage of time than employees without children, but they also reported working at home the same percentage of time or more than other employees.

Other evidence suggests that employees with children simply made the system work for them—to their advantage. Employees with children were more likely to report working "non-traditional" hours than those without children. Two theories arise: that employees with children were in fact using the system to help them balance work and family needs, or that working at home during traditional hours was unproductive. Given that their overall work effectiveness ratings were similar, the first theory appears to be more accurate.

Home Workspace

The type of home workspace did not influence employees' overall satisfaction with their effectiveness in the mobility program. Nor did it influence their perception of how effective they were at home. Our expectation was that employees with rooms at home would be more effective working at home than those with areas within rooms serving other purposes because they would be better able to control the level of distraction and interruption, and because having a dedicated room would provide a more distinct separation of home and work life. Mobile employees credited the home office as the most productive setting because of their ability to concentrate—regardless of whether they were in dedicated rooms *or* areas.

These findings suggest that boundaries need not necessarily be physical, but can be spatial, temporal, or behavioral and achieve similar results. Organizations such as Chiat/Day and SOL Cleaning Company in Finland, which have both eliminated private offices in exchange for a variety of open, non-territorial team spaces, illustrate that this finding is also applicable to office environments. One can sit in the Club Room or the dining room, respectively, and carry on a private conversation or conduct concentrative tasks, even though these areas may be extremely crowded and noisy. Essentially, there is so much activity and stimulation in these areas, that it is virtually impossible to overhear confidential conversations. Individuals wishing to work on concentrative tasks can essentially "lose" themselves in the environment; again, there is so much going on in the environment that it is difficult to focus on (or be distracted by) any one happening.

Communication

Over three-quarters of the respondents reported that professional communication at work was somewhat or much worse since the mobility program began; over 88% rated their ability to socialize with their co-workers as worse or much worse. These findings confirm the work of DuBrin (1991), Huws et al. (1990), and Salomon and Salomon (1984) all of which concluded that

loss of social interaction with co-workers was one of the greatest disadvantages to working remotely.

It was hypothesized that because single or childless couples may have fewer interactions at home, with no or fewer people, they may depend more on interaction at work; thus, when opportunities for interaction decreased through distribution of work to other settings outside the office, it was expected that satisfaction ratings would be lower. However, for both categories of communication (professional and social), scores were uniformly low; no one group had significantly higher or lower scores for satisfaction with communication. The findings would seem to indicate that employees with families were not compensating for the loss of social interaction with friends or family members. In addition, while relationships with clients may have changed as a result of the program, the change was not sufficient to make up for the interaction that occurred previously in the central office.

Gordon (1988) postulates that in a remote work environment, the central office is used for meetings, presentations, and socializing. In this case, the central office or the Productivity Center was not seen as the place providing for all of these functions. While employees mentioned that they conducted planned meetings in the Productivity Center, there was no mention of social interaction occurring in this environment. It is unclear whether this was not mentioned because it was not occurring or because employees did not see this activity as significant.

Job Stress

The data for job stress indicated that, although employees with children were making the system work for them—their satisfaction and work effectiveness were similar to employees without children—it provided an element of stress that employees with fewer family obligations did not experience. Many employees with families mentioned that they had to make specific rules and policies for their children when they were working at home. The ability of employees without children to easily control the work flow through not having to make these rules and agreements about sharing space may have eliminated a certain level of stress.

Role Conflict and Spillover

There were no significant differences as a function of household composition or home workspace for roll conflict or spillover. Perhaps the flexibility of a mobile work environment acts as a mediator of role conflicts, as was suggested by Ahrentzen (1990) when she found that role overlap does not always result in role conflict. That degree of role conflict as a function of type of workspace at home was not significantly different contradicts the findings of McLaughlin (1981).

McLaughlin's study concluded that the presence of rigid boundaries (provided by a separate room) would increase role interference; if this were true, the mobile employees in the present study who occupied dedicated rooms at home would have significantly higher (more negative) scores than those with dedicated areas. This was not the case. Ahrentzen (1990) explained McLaughlin's finding as a function of expectations: if one expects to be able to control role conflicts with a closed door, but the closed door is not effective, then satisfaction with working at home would be lower than for one who expects to experience role conflict because they work in a room shared by others. The findings of this research also refute the work of Beach (1989), who suggested that the presence of more fluid boundaries decreases role conflict by facilitating the integration of work and home life; thus, mobile employees with areas (as opposed to rooms) would have lower scores for role conflict. Again, this was not the case.

Nearly 50% of the respondents reported that positive or very positive spillover occurred as a result of the mobility program. The response was uniform across home workspace and household composition. This finding confirms the work of Becker (1986), which hypothesized that negative spillover between work and home would be minimized in a series of loosely-coupled settings. It also confirms the work of Beach (1989) which concluded that families may enjoy more positive spillover because of the integration of work and home life.

Gender differences had a significant influence on spillover and roll conflict. Females reported more positive spillover and less role conflict than did males. This result contradicts the findings of Greenglass et al. (1988), Gurstein (1991), Izraeli (1988), Pleck and Staines (1985), and Voydanoff and Kelly (1984), which indicated that females would experience higher role conflict than males. Gurstein speculated that males and females would experience working at home differently because females usually cope with the dual responsibilities of work and family, while males are generally less responsible for household and family tasks, and would find it easier to perceive themselves as doing paid work at home.

Conclusion

Data from this study suggest that employee acceptance of an integrated workplace strategy where one key component of the workplace system is the opportunity to work at home (as well as in other workplace settings) is largely unaffected by household composition (whether or not the employee has children or family members at home) or the nature of the home workspace (whether or not work at home is done in a dedicated room or a dedicated area within a room used by other family members for family activities). There are, however, several factors that need to be considered in interpreting these results.

By providing employees with a range of settings and the technology and support they needed to perform work at any time and at several key settings, the IBM Midwest Mobility Program goes considerably beyond typical flextime programs in which there are a few hours during the morning or evening during which employees can arrange their schedules. The mobility program studied here provides virtually unlimited choice in where and when one works, thus making it easier to balance work and family life.

Although creation of the program was cost-driven, the flexibility was driven by a demand-side model in which the approach of the program was designed to support effective work patterns and customer requirements, rather than by a supply-side model in which the key driver is compliance with the Clean Air Act or other transportation-driven regulations (Becker, Gray, Markus & PonTell, in press). Supply-side models driven by the goal of reducing air pollution tend to substitute one set of fairly rigid time-work patterns (the typical 8am-5pm workday) with another (the requirement to spend a specific day in a telework center, for example, on a fixed schedule) in order to minimize the number of cold-starts (starting the engine, which is the major cause of air pollution).

The importance of this greater time/space freedom is underscored by the finding in this study that almost 40% of the respondents reported their most effective work time to be *outside* the traditional 8 a.m. to 5 p.m. workday. For some, this meant working very early in the morning; for others, late at night. And while approximately 35% of the respondents reported working from home, significant percentages worked from the customer site or the Productivity Center, suggesting that the opportunity to work from multiple locations was an important component of the flexibility that employees valued. This added flexibility may have been especially appreciated by female employees, who generally rated satisfaction with the mobility program higher than men. It is unclear whether this is because, as some would say, women are more flexible and open to change, or because women use the flexibility provided by the program to balance home and work life, a need that is not as prevalent among men.

The high use of the home as a workplace setting, and the high level of reported satisfaction with this setting, also needs to be put in context. In the Midwest, where this study occurred, a high proportion of employees own their home, rather than rent an apartment. A significant proportion had a dedicated room for their work at home, with the remainder having a dedicated area within a multi-purpose room. Virtually none of our sample lived in a situation where they had to assemble and disassemble their work tools, supplies, and materials each time they started or ended work.

Yet even under the fairly ideal conditions of having a dedicated room or area, families with pre-school children reported higher levels of stress and role conflict than those with no children. While these conflicts were not sufficiently intense to undermine a high level of overall satisfaction with the mobility program and the flexibility it provided, they are likely to be experienced as more intense in smaller living environments, such as apartments in urban areas. At the very least, the more the home-work environment must vie with living space, the more likely it is that employees will have to devote energy and imagination to developing rules and protocol for how and when family members interact, where and when certain activities occur, and so on.

For a number of reasons, our data should not be used to gauge the percentage of time mobile workers in general spend in the various work settings available to them. The first, as noted above, is that the high percentage of home ownership (with the greater feasibility of having dedicated work rooms and areas) may not apply in more dense urban areas or areas where housing costs are high. The second is that the use of the Productivity Center may have been limited by two of its characteristics. Another reason was that parking was difficult to find near the Productivity Center, and had to be paid for by the employee (whereas before it was paid for by the company). Thus dropping into the Productivity Center was not always easy. Secondly, the Productivity Center was viewed by many of the respondents as a fairly dreary and unattractive place in terms of the quality of space. Thus it was not a place that acted, by itself, as a magnet (and was not intended to). Were it a more convivial place and were more employees living in smaller apartments or houses, it is possible the Productivity Center use might vary considerably.

The issue of conviviality is not a trivial one. Seventy-seven and eighty-eight percent of the respondents reported that professional and social communication, respectively, had suffered as a result of the mobility program. A critical issue that organizations need to investigate is this loss of communication, both social and professional. Without programs to stimulate planned informal interaction and business communication, the organization looses the collective learning and connectivity that is so valuable to the long-term success of the organization. In this context the design of the Productivity Center might be rethought, so that it provided more opportunities for informal communication and conversation. As currently designed, it is essentially a maze of identical workstation cubicles, with no attention paid to informal social or work relations.

Two other findings are worth highlighting. One is that employees worked on average sixty hours a week, and that this was more than they had worked previously. It cannot be concluded from our data that this was all a result of the mobility program (as opposed to, for example, greater work pressures coming from a company working feverishly to improve its balance sheet). Whatever the reason, it is a brutal pace to maintain for a long period of time. Second, the finding that employees who had been working with the mobility program for twelve months were less satisfied than those working less than twelve months suggests the need to further investigate the underlying reasons for this decline. Is it just the number of hours worked; is this high number of hours related to the difficulty of stopping work when it is so close at hand all the time; or is it because of increasing dissatisfaction with professional and social communication? Our data cannot answer these questions, but for companies who are developing programs like IBM's mobility program as a long-term workplace strategy, these questions should be addressed.

Finally, from IBMs viewpoint, and from other firms that might want to initiate similar programs, there is a lot to recommend this kind of integrated workplace strategy. Close to 52% of the respondents indicated that their overall work effectiveness (not just the number of hours they worked) was better or much better than under the conventional workplace arrangement they had previously. Much of this effectiveness, without doubt, can be attributed to provision of state-of-the-art technology. But much of it also can be attributed, as repondents' comments and survey responses show, to the flexibility of being able to choose both where and when to work. Coupled with demonstrable real estate savings, these data explain why so many companies are actively exploring new workplace strategies. Whether these real estate savings will ultimately be eroded by the costs of providing quality training and support in the use of the technology and the new way of working, as well as by ongoing monthly service charges for telephone lines and reduced opportunities for social and professional communication, is at this point unclear. But what is clear is that this kind of mobile working is appreciated by many employees, and that household composition and the nature of the home workspace, within the limitations represented in our study, do not have a major influence on overall satisfaction and work effectiveness.

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Appendix A:

Mobile Workplace Survey

International Workplace Studies Program

CORNELL UNIVERSITY
NYS College of Human Ecology

Mobile Workplace Survey

PART I	Background Information
PART II	Work Activity
PART III	Work Environment
PART IV	Mobility Program
PART V	Home Life Characteristics
PART VI	Additional Comments

PURPOSE:

The purpose of this survey is to identify aspects of the mobility program that work well or could be improved from the employee's perspective. The information you provide will help to establish whether and how mobility has changed the way the work day is used, whether certain types of employees are better suited to mobility than others, and future requirements for the program as it is developed. Finally, your responses will help the mobility team to assess its effectiveness in planning and implementing the program. No data will be associated with any specific individual.

INSTRUCTIONS:
Please answer carefully the questions which follow. The survey will take approximately 20 minutes to complete. When you are done, use the envelope provided to return your survey directly to the Cornell Research Team, which will insure complete confidentiality of your responses. Thank you very much for your participation.

PART I BACKGROUND INFORMATION

Please circle the letter next to the appropriate response, except where blanks are provided for responses.

1 How long have you been working full time, including IBM and non-IBM positions?

a. less than 1 year
b. 1 - 5 years
c. 6 - 10 years
d. 11 - 15 years
e. 16 - 20 years
f. more than 20 years

2 How long have you been with IBM?

a. less than 1 year
b. 1 - 5 years
c. 6 - 10 years
d. 11 - 15 years
e. 16 - 20 years
f. more than 20 years

3 What is your current position or title?

_____

4 How long have you been in your current position, or a position like the one you hold now?

a. less than 1 year
b. 1 - 5 years
c. 6 - 10 years
d. 11 - 15 years
e. 16 - 20 years
f. more than 20 years

5 How long have you been participating in the mobility program?

a. less than 3 months
b. 3 - 6 months
c. 7-12 months
d. more than 12 months

6 What is your age?

a. 19 years or less
b. 20 - 29 years
c. 30 - 39 years
d. 40 - 49 years
e. 50 - 59 years
f. over 60 years

7 What is your gender?

a. Female
b. Male

8 What is your ethnic background?

____ White (not of Hispanic origin, but Europe, North Africa or the Middle East)
____ Black (not of Hispanic origin, but any of the black racial groups of Africa)
____ Hispanic (persons of Mexican, Puerto Rican, Central or South American origin)
____ American Indian or Alaskan (of tribal origin or affiliation)
____ Asian or Pacific Islander (includes Far East, Southeast Asia, the Indian Subcontinent, Pacific Islands, China, Japan, Korea, Philippines and Somoa)

PART I BACKGROUND INFORMATION - continued

9 What is your marital status?

a. Single
b. Married or Partnered
c. Separated
d. Divorced
e. Widowed

10 If married or partnered, please circle the letter next to the category which best describes your spouse or partner's work status, indicating whether work is full or part time. Circle all that apply.

a. Paid work/job outside home _____ Full time _____ Part time
b. Paid work/job inside home _____ Full time _____ Part time
c. Neither (spouse or partner does not earn income)
d. Other (please specify) _____

11 Do you share your home with any other adults or children?

a. Yes
b. No

12 If you answered "yes" to question 11, please fill in the blanks with the number of adults & children in each range below:

a. ____ # less than 5 years
b. ____ # 5 - 8 years
c. ____ # 9 - 12 years
d. ____ # 13 - 18 years
e. ____ # over 18 years
f. ____ # independent adults
g. ____ # dependent adults

13 Do you have a disability which makes working in the mobility program:

a. More desirable?
b. Less desirable?
c. No impact, though have disability
d. No impact, don't have disability

14 When you work at home, where do you work?

a. Dedicated ROOM (primarily used for work purposes)
b. Dedicated AREA in room (room has other purposes, but work area is used for work ONLY)
c. Non-dedicated AREA in room (must set up and dismantle work area for each work session)

15 If you circled (b) or (c) in question 14, please indicate the type of room your work area occupies:

a. Kitchen
b. Dining room
c. Family room
d. Living room
e. Bedroom
f. Den
g. Finished basement
h. Unfinished basement
i. Garage
j. Other (please specify) _____

PART II WORK ACTIVITY

Please circle the letter next to the appropriate response, except where blanks are provided for response.

16 On average, how many hours per week do you spend working?

a. less than 20 hours
b. 21 - 30 hours
c. 31 - 40 hours
d. 41 - 50 hours
e. 51 - 60 hours
f. over 60 hours

17 Compared to before you started the mobility program, have your average work hours changed?

a. I work more hours now
b. I work about the same number of hours
c. I work fewer hours now

18 Over the course of an average WEEK, please indicate, for each location, how many TIMES you work, the TYPICAL amount of time spent in a setting each time you use it, and the MINIMUM and MAXIMUM amount of time you spend in each setting.

	Times per week	Typical amount of time (hrs.)	Min - max time in each setting
EXAMPLE: a. Home work area	**8**	**4 hrs.**	**2 - 8 hrs.**
a. Home work area			
b. Productivity center			
c. Client premises			
d. Other IBM locations (formal)			
e. Other IBM locations (informal, e.g. parts drops)			
f. Car			
g. Restaurant			
h. Hotel			
i. Other (please specify below)			

19 Please go back to question 18 and circle the letter next to the setting in which you are MOST PRODUCTIVE. Explain briefly what about the setting that makes you more productive there.

20 When do you usually do your best work? Circle all that apply.

a. 8 am - 12 pm
b. 12 pm - 4 pm
c. 4 pm - 8 pm
d. 8 pm - 12 am
e. 12 am - 4 am
f. 4 am - 8 am
g. Other (please describe below)

PART III WORK ENVIRONMENT

For the following statements, please rate how strongly you agree or disagree with each statement by placing a circle around the number beneath the appropriate response.
(5 = STRONGLY AGREE; 4 = MOSTLY AGREE; 3 = NEUTRAL; 2 = MOSTLY DISAGREE;
1 = STRONGLY DISAGREE)

21 JOB CHARACTERISTICS

	ST A	SM A	Neutral	SM DA	ST DA
a. My job is usually interesting	5	4	3	2	1
b. I'm happy in my job	5	4	3	2	1
c. I dislike my job	5	4	3	2	1
d. I am satisfied with my job	5	4	3	2	1
e. I am enthusiastic about my job	5	4	3	2	1
f. My job is rather monotonous	5	4	3	2	1
g. I am satisfied with the mobility program	5	4	3	2	1
h. My job is not very stressful	5	4	3	2	1
i. I usually have to work fast	5	4	3	2	1
j. I am able to control the amount of work I do in a day	5	4	3	2	1
k. I often feel stressed while working	5	4	3	2	1
l. My job demands a lot of concentration	5	4	3	2	1
m. I often feel overworked in my job	5	4	3	2	1

For the following characteristics, please rate the degree to which each has changed since the mobility program began, by placing a circle around the number beneath the appropriate response
5 = MUCH BETTER; 4 = SOMEWHAT BETTER; 3 = NO CHANGE;
2 = SOMEWHAT WORSE; 1 = MUCH WORSE)

22 PERFORMANCE CHARACTERISTICS

"Since the mobility program began, is this better, t he same, or worse?"	MB	SB	NC	SW	MW
a. My overall work quality	5	4	3	2	1
b. My overall ability to get work done	5	4	3	2	1
c. My ability to communicate about work with co-workers	5	4	3	2	1
d. My ability to socialize with co-workers	5	4	3	2	1
e. My overall work effectiveness	5	4	3	2	1
f. My overall use of time	5	4	3	2	1
g. My overall ability to do work requiring high levels of concentration	5	4	3	2	1
h. Ability to get the help I need to solve problems in a timely manner	5	4	3	2	1
i. Ability to provide help and support to others in a timely manner	5	4	3	2	1
j. The effectiveness of my team, or work group	5	4	3	2	1

There are two things that you will rate in this section, SATISFACTION and IMPORTANCE. Question 23 asks about the PRODUCTIVITY CENTER, while Question 24 focuses on the HOME WORKSPACE. First, please rate how SATISFIED you are with the characteristics listed below, by placing a circle around the number beneath the appropriate response on the RIGHT side of the page (5 = VERY SATISFIED; 4 = SOMEWHAT SATISFIED; 3 = NEUTRAL; 2 = SOMEWHAT DISSATISFIED; 1 = VERY DISSATISFIED)

Second, please go back and rate how IMPORTANT each issue is to you on a scale of 5 to 1, placing the number in the blank to the LEFT of each item (5 = VERY IMPORTANT; 4 = SOMEWHAT IMPORTANT; 3 = NEUTRAL; 2 = SOMEWHAT UNIMPORTANT; 1 = VERY UNIMPORTANT)

23 **PRODUCTIVITY CENTER SATISFACTION**

Importance Rating (5-1)	*Characteristics*	***Satisfaction Rating*** VS	SS	N	SD	VD
___	a. Quality of the physical environment, overall	5	4	3	2	1
___	b. Ability to work effectively at the Productivity Center	5	4	3	2	1
___	c. Amount of work space, overall	5	4	3	2	1
___	d. The ambient environment (heat, air, lighting, noise)	5	4	3	2	1
___	e. Technology (computer, phone, fax, printer, etc.)	5	4	3	2	1
___	f. Ability to concentrate	5	4	3	2	1
___	g. Interaction with co-workers	5	4	3	2	1
___	h. Access to information (files, references, manuals)	5	4	3	2	1
___	i. Access to technical support	5	4	3	2	1
___	j. Access to administrative support	5	4	3	2	1
___	k. Furniture for personal work activities (desk, chairs, etc.)	5	4	3	2	1
___	l. Adequacy of storage space	5	4	3	2	1
___	m. Overall design and layout of work area as a place to work	5	4	3	2	1
___	n. Parking	5	4	3	2	1

24 **HOME WORKSPACE SATISFACTION**

Importance Rating (5-1)	*Characteristics*	***Satisfaction Rating*** VS	SS	N	SD	VD
___	a. Quality of the physical environment where I work, overall	5	4	3	2	1
___	b. Ability to work effectively in my home	5	4	3	2	1
___	c. Amount of work space, overall	5	4	3	2	1
___	d. The ambient environment (heat, air, lighting, noise)	5	4	3	2	1
___	e. Technology (computer, phone, fax, printer, etc.)	5	4	3	2	1
___	f. Ability to concentrate	5	4	3	2	1
___	g. Interaction with co-workers	5	4	3	2	1
___	h. Access to information (files, references, manuals)	5	4	3	2	1
___	i. Access to technical support	5	4	3	2	1
___	j. Access to administrative support	5	4	3	2	1
___	k. Furniture for personal work activities (desk, chairs, etc.)	5	4	3	2	1
___	l. Adequacy of storage space	5	4	3	2	1
___	m. Overall design and layout of work area as a place to work	5	4	3	2	1

PART IV MOBILITY PROGRAM

Please rate the IMPACT (positive, neutral, or negative) that the mobility program has had on features of your life. Question 25 asks about work life, while question 26 looks at home life.

Place a circle around the number beneath the appropriate response. (5 = VERY POSITIVE IMPACT; 4 = SOMEWHAT POSITIVE IMPACT; 3 = NO IMPACT; 2 = SOMEWHAT NEGATIVE IMPACT; 1 = VERY NEGATIVE IMPACT

25 FEATURES OF WORK LIFE

	"Impact the mobility program has had on..."	Very Positive	Some Positive	No Impact	Some Negative	Very Negative
a.	Personal expenses for work	5	4	3	2	1
b.	Commuting time	5	4	3	2	1
c.	Work attire	5	4	3	2	1
d.	Tendency to procrastinate	5	4	3	2	1
e.	Advancement opportunities	5	4	3	2	1
f.	Freedom to work when most productive	5	4	3	2	1
g.	Ability to concentrate while working	5	4	3	2	1
h.	Feedback on your performance	5	4	3	2	1
i.	Task demands and pressures	5	4	3	2	1
j.	Ability to get work done on time	5	4	3	2	1
k.	Seriousness with which you think others view your job	5	4	3	2	1
l.	Level of earnings	5	4	3	2	1
m.	Adequacy of technology	5	4	3	2	1
n.	Training on use of technology	5	4	3	2	1
o.	Relationships with co-workers	5	4	3	2	1
p.	Relationships with customers	5	4	3	2	1
q.	Relationship with your manager	5	4	3	2	1
r.	Ability to obtain in-house knowledge & expertise	5	4	3	2	1
s.	Commitment to the company	5	4	3	2	1
t.	Professional development and growth	5	4	3	2	1

26 FEATURES OF HOME LIFE

	"Impact the mobility program has had on..."	Very Positive	Some Positive	No Impact	Some Negative	Very Negative
a.	Management of home chores	5	4	3	2	1
b.	Leisure time and personal interests	5	4	3	2	1
c.	Physical health	5	4	3	2	1
d.	Emotional health	5	4	3	2	1
e.	Quality of life	5	4	3	2	1
f.	Distinction between home and work roles	5	4	3	2	1
g.	Opportunity to meet childcare and family demands	5	4	3	2	1
h.	Relationship with your spouse or partner	5	4	3	2	1
i.	Relationships with your children	5	4	3	2	1

PART IV MOBILITY PROGRAM - continued

Please rate how SATISFIED you are with the features of the mobility program listed below, by placing a circle around the number beneath the appropriate response (5 = VERY SATISFIED; 4 = SOMEWHAT SATISFIED; 3 = NEUTRAL; 2 = SOMEWHAT DISSATISFIED; 1 = VERY DISSATISFIED)

"How satisfied are you with...?"

		VS	SS	N	SD	VD
27	The opportunity you were given to participate in the mobility program PLANNING process	5	4	3	2	1
28	Your participation in the PLANNING process	5	4	3	2	1
29	The opportunity you are given to participate in the mobility program EVALUATION process	5	4	3	2	1
30	Your participation in the EVALUATION process	5	4	3	2	1

PART V HOME LIFE CHARACTERISTICS

For the following statements, please rate how strongly you agree or disagree with each statement by placing a circle around the number beneath the appropriate response (5 = STRONGLY AGREE; 4 = SOMEWHAT AGREE; 3 = NEUTRAL; 2 = SOMEWHAT DISAGREE; 1 = STRONGLY DISAGREE)

31 ***"Since I began the mobility program..."***

		ST A	SM A	N	SM D	ST A
a.	Separation of work and family life has become difficult	5	4	3	2	1
b.	My satisfaction with my home life has increased	5	4	3	2	1
c.	Tensions due to working at home have increased	5	4	3	2	1
d.	It is easier to find the place, than the time, to work at home	5	4	3	2	1
e.	My childcare/dependent care expenses have increased	5	4	3	2	1
f.	I've changed work patterns to suit my childcare needs	5	4	3	2	1
g.	I've changed childcare arrangements to suit my work patterns	5	4	3	2	1

For the following statements, please rate the degree to which each attribute has increased or decreased by placing a circle around the number beneath the appropriate response (5 = GREATLY INCREASED; 4 = SOMEWHAT INCREASED; 3 = HASN'T CHANGED; 2 = SOMEWHAT DECREASED; 1 = GREATLY DECREASED; N/A = NOT APPLICABLE)

32 ***"Since I began the mobility program..."***

		GI	SI	NC	SD	GD
a.	My need to take time off for child/dependent care has...	5	4	3	2	1
b.	My use of sick time has...	5	4	3	2	1
c.	Complications surrounding school breaks & vacations have...	5	4	3	2	1
d.	My satisfaction with child or dependent care options has...	5	4	3	2	1
e.	Family's understanding of my work responsibilities has...	5	4	3	2	1

33 Have you established any rules at home which help you to manage home and work boundaries? Please share them below.

PART VI ADDITIONAL COMMENTS

34 What changes, if any, would you like to see made in the mobility program?

35 What changes, if any, would you like to make in your home work space?

36 What changes, if any, would you like to see made in the Productivity Center?

37 Please describe any benefits or problems regarding the mobility program that were not adequately addressed by this survey.

38 What do you like most about the mobility program?

39 What do you like least about the mobility program?

40 Would you be willing to participate in an interview with a member of the Cornell research team? If interested, please fill in the information below and a member of the team will contact you. All responses are confidential.

Name

Phone

E-Mail

Appendix B:

Interview Introduction

INTERVIEW INTRODUCTION:

Today we'll be talking about how work gets done in a mobile environment and how working at home changes the way work is carried out. We'll also be discussing the home-work interface, as well as some of the changes that have occurred in your interactions with co-workers, managers, customers, and your family

1. What is your job title and what do you do?
2. Please describe what a typical working days is like for you.
3. Where do you work, and for which activities?
4. How do you decide where to work?
5. Tell me about the difference between your interactions now as opposed to before mobility.
6. What *specifically* do you miss?
7. What sorts of tools do you use to communicate with other IBMers?
8. What are some of the ways that your work & home life interfere with each other?
9. How do you maintain a separation between home and work life?
10. Does your family ever get involved in your work? How?
11. What about your work and home life make you feel overloaded?
12. What methods have you tried for reducing overload? Did they work?

Appendix C:

Location Identifier Sheet

LOCATION IDENTIFIER SHEET

For each exposure you take, please place a mark in the box corresponding to the appropriate location. Please be sure to include this sheet along with the camera, in the return package. Thank you.

Exposure	Home	Productivity Center	Client Site	IBM Formal	IBM Informal	Car	Other (Please identify)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
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16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							

Which Productivity Center do you use?

____ Indianapolis
____ Ft. Wayne
____ South Bend
____ Evansville